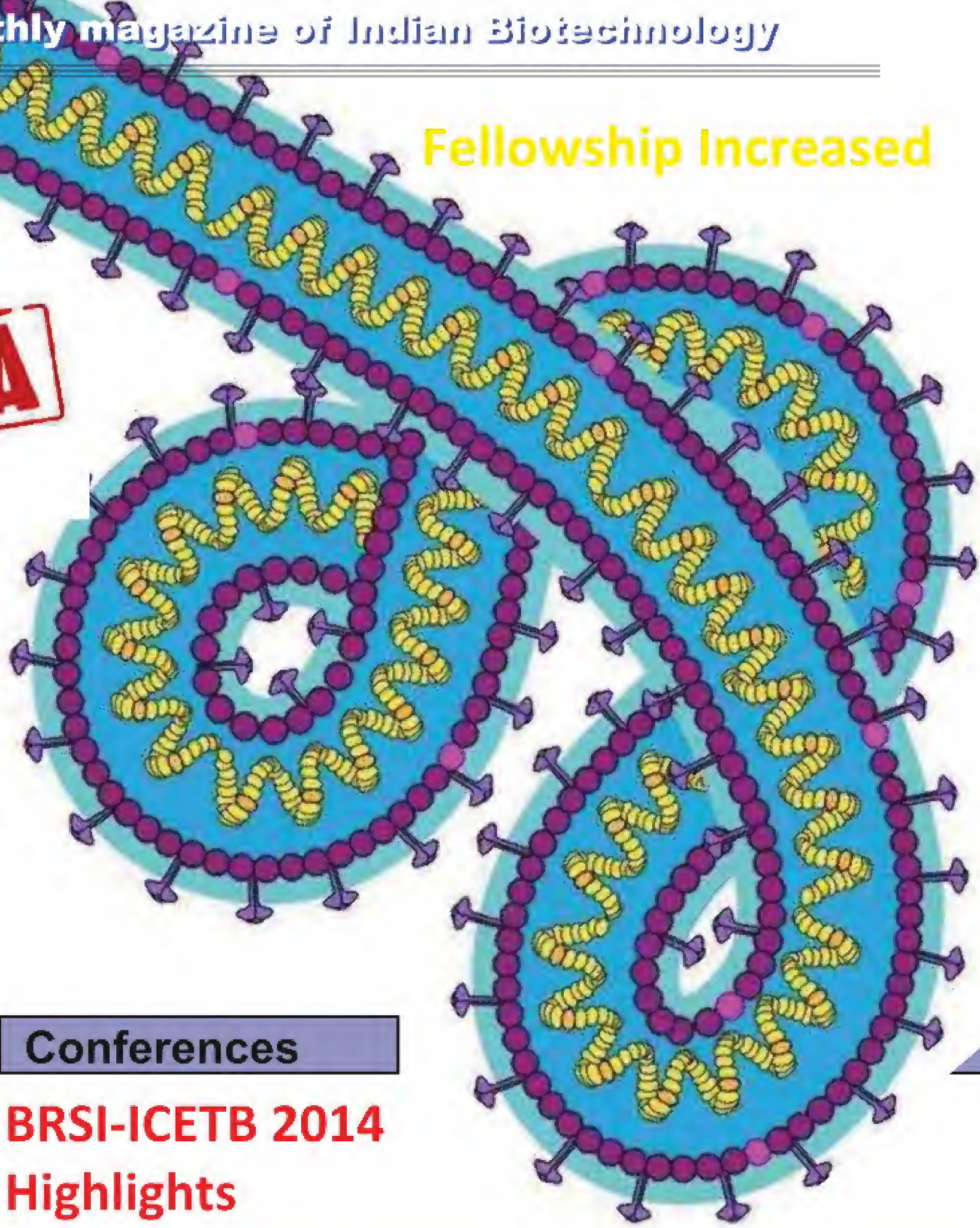
Vol 2 issue 4 November 2014 Rs - 60

BIOTECH EXPRESS

The monthly magazine of Indian Biotechnology

Fellowship Increased



Cover Article

Ebola Virus and Ebola virus disease.

Conferences

BRSI-ICETB 2014 Highlights

Cover Special - world's most deadly disease

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Postal Registration No. - UP/GBD-196/2014-16

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birth defects attributed to the pesticide 'round-up'

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In this issue find special topics and updates related to Biotech and allied sciences.

TWAS, India

BIOTECH EXPRESS

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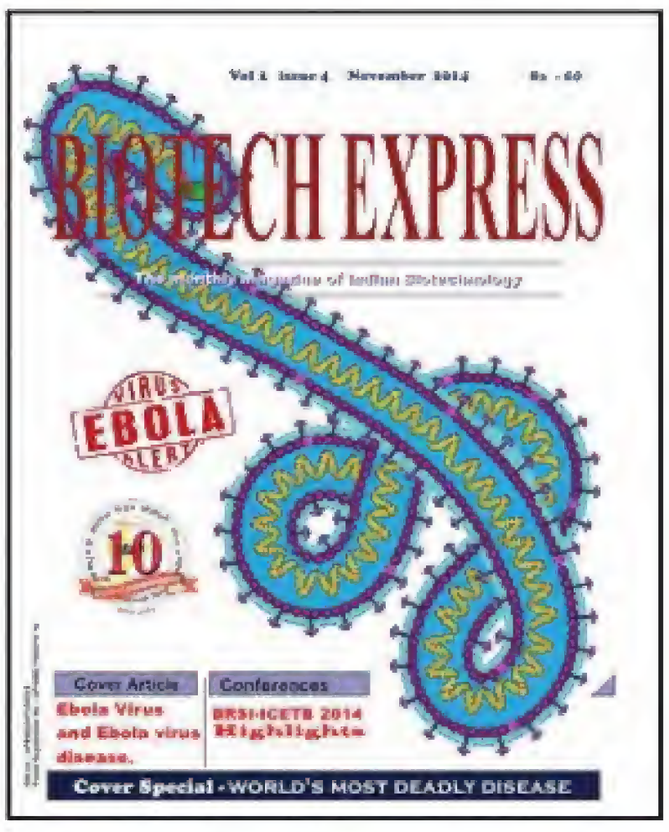


FROM EDITOR'S DESK

Biotech Express editorial Board welcomes you to read India's premiere and most famous magazine of Biotechnology and allied Sciences sector. This magazine has news section which covers most authentic articles and varrious notification related to Biotech. Biotech Express is the only Biotech acdemia magazine of India with more than 10k members from India and abroad.

We are more than happy to complete one year sucessfully with ever increasing subscribers and thousands of Readers. In this volume of Biotech Express some modifications has been done to cover broad spectrum of news. Last year the cover special was "Model organisms in Research" and in present volume we will cover "World's deadliest disease" in the context of India. 'News in focus' will bring latest news of Indian Biotechnology to stay updated with ongoing situation.

This magazine has been designed for academic purpose, however it also covers Industry insights.

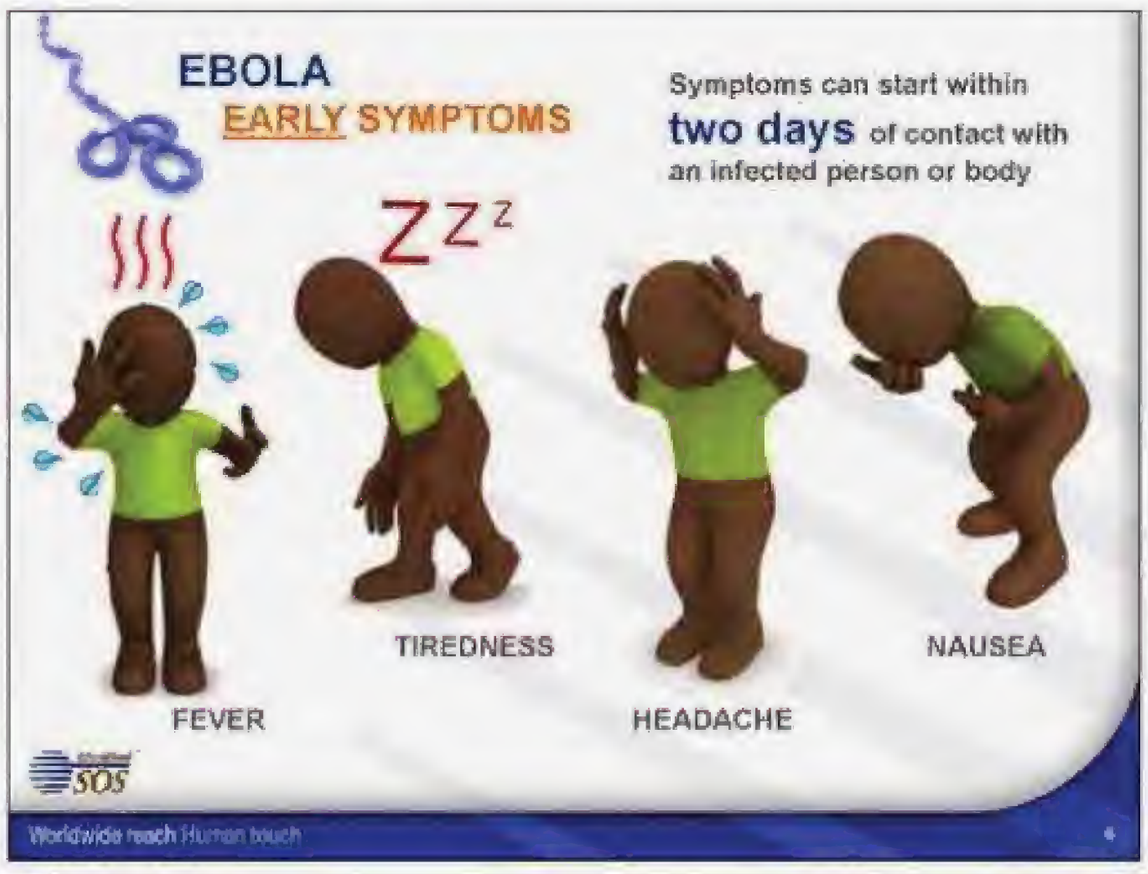
Chief Editor:
Dr. Seema P. Upadhye

COVER ARTICLE

Deadliest Diseases of the world

The Ebola virus causes an acute, serious illness which is often fatal if untreated. Ebola virus disease (EVD) first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku,Democratic Republic of Congo. The latter occurred in a village near the Ebola River, from which the disease takes its name.

The current outbreak in west Africa, (first cases notified in March 2014), is the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread between countries starting in Guinea then spreading across land borders to Sierra Leone and Liberia, by air (1 traveller only) to Nigeria, and by land (1 traveller) to Senegal.



Ebola virus (EBOV, formerly designated Zaire ebolavirus) is one of five known viruses within the genus Ebolavirus. Four of the five known ebolaviruses, including EBOV, cause a severe and often fatal hemorrhagic fever in humans and other mammals, known as Ebola virus disease (EVD).

Ebola virus Morphology

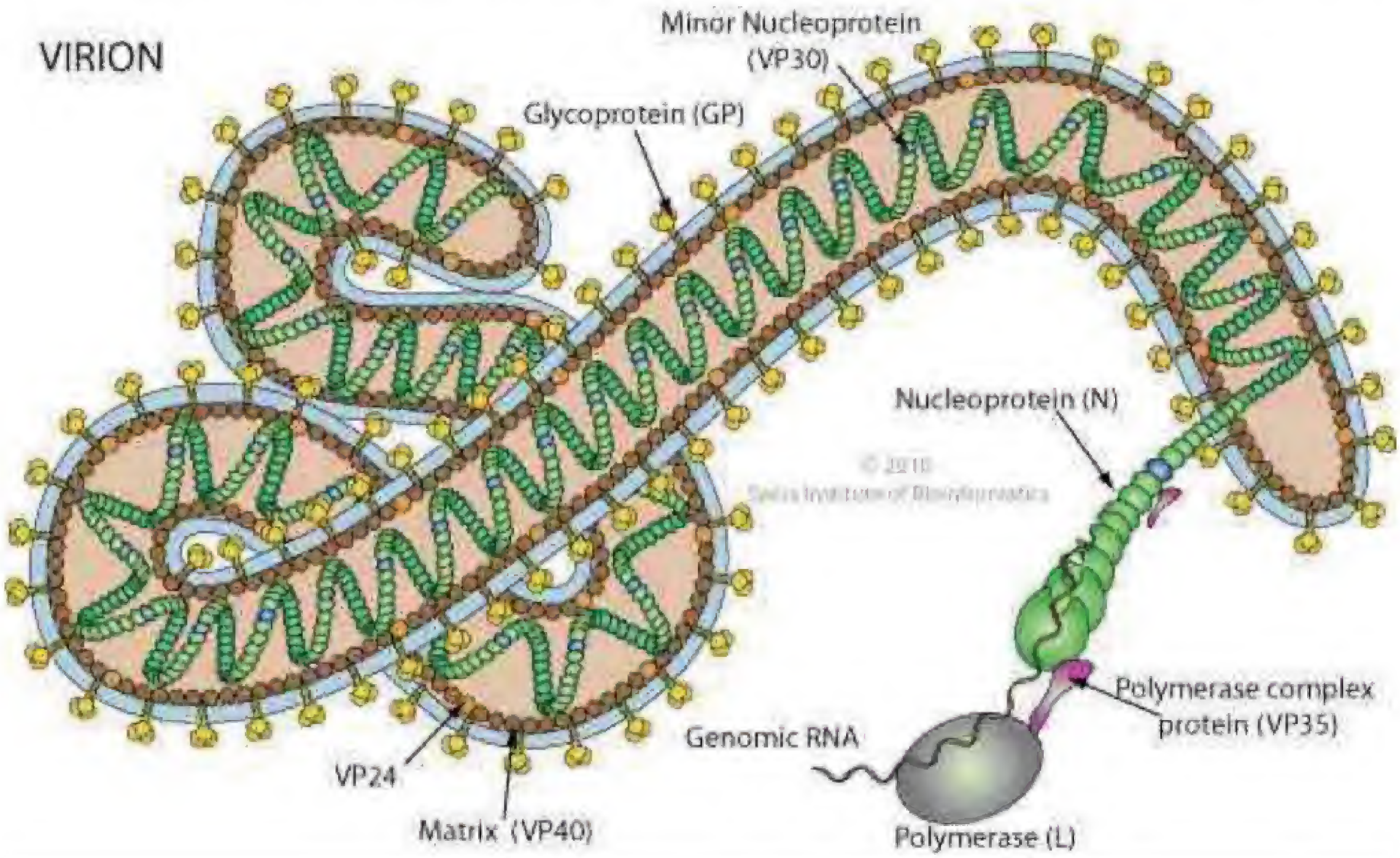
EBOV carries a RNA genome in virions that are cylindrical/tubular, and contain viral envelope, matrix, and nucleocapsid components. The overall cylinders are generally approximately 80 nm in diameter, and having a virally encoded glycoprotein (GP) projecting as 7-10 nm long spikes from its lipid bilayer surface. The capsid has a helical morphology and is encased inside a membrane envelope. Several viral proteins and glycoproteins stud the membrane.

Ebola virus Genome

Each virion contains one molecule of linear, single-stranded, negative-sense RNA, 18,959 to 18,961 nucleotides in length. The 3′ terminus is not polyadenylated and the 5′ end is not capped. This viral genome codes for seven structural proteins and one non-structural protein. The gene order is 3′ – leader – NP – VP35 – VP40 – GP/sGP – VP30 – VP24 – L – trailer – 5′; with the leader and trailer being non-transcribed regions, which carry important signals to control transcription, replication, and packaging of the viral genomes into new virions.

Replication

Being acellular, viruses such as Ebola do not replicate through any type of cell division; rather, they use a



combination of host- and virally encoded enzymes, alongside host cell structures, to produce multiple copies of themselves. These then self-assemble into viral macromolecular structures in the host cell.
The virus begins its attack by attaching to host receptors through the glycoprotein (GP) surface peplomer and is endocytosed into macropinosomes in the host cell. To penetrate the cell, the viral membrane fuses with vesicle membrane, and the nucleocapsid is released into thecytoplasm. Encapsidated, negative-sense genomic ssRNA is used as a template for the synthesis (3'-5') of polyadenylated, monocistronic mRNAs and, using the host cell's ribosomes, tRNA molecules, etc., the mRNA is translated into individual viral proteins.

Ebola Virus Proteins

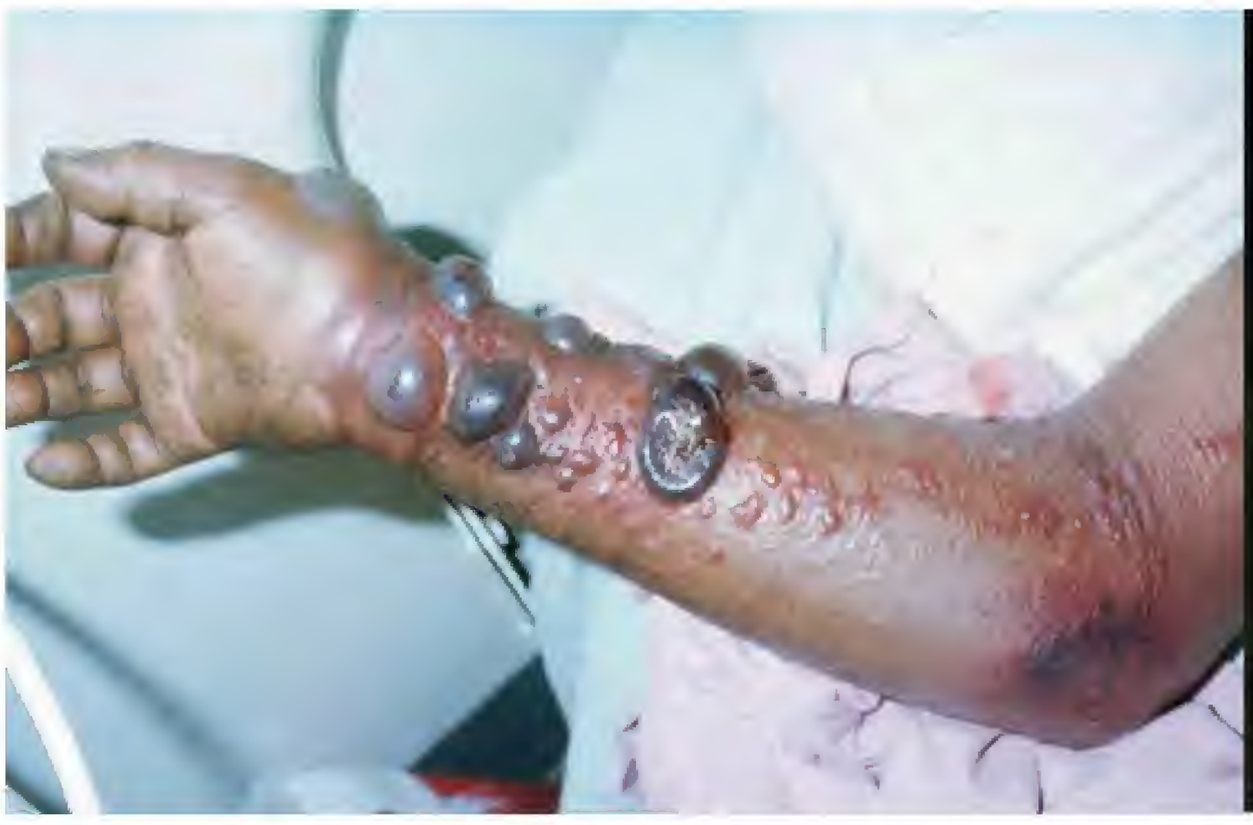
The genome of ebola virus contains instructions for building seven proteins, which assemble with the genomic RNA to form one of the deadliest viruses.
Ebola matrix protein, also known as VP40, shapes the virus and drives the process of budding. Many copies of the protein associate on the membrane, and are thought to make connections both to the membrane and to the nucleocapsid.
At the center of the virus,. In the center of the particle a complex nucleocapsid which protects the genome is the viral nucleocapsid which consists of the helical ssRNA genome wrapped about the NP, VP35, VP30 and L proteins. Between the capsid and envelope are viral proteins VP40 and VP24.

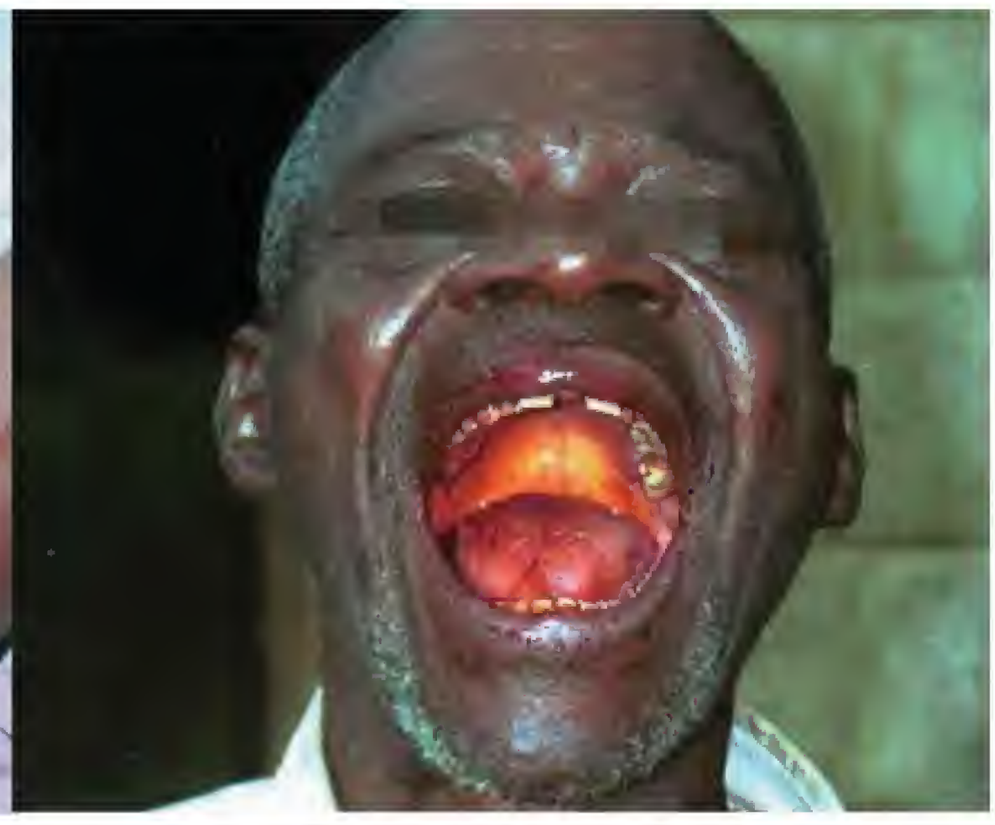
Moonlighting Proteins

Since viruses only have room in their small genomes to encode a few proteins, these viral proteins often moonlight in several jobs apart from their main task. The matrix protein of ebola is particularly unusual because it adopts entirely different structures for its different jobs: as a hexamer in the virion structure (PDB entry 4ldd), as an octamer that binds to RNA and regulates viral transcription (PDB entry 1h2c), and as a dimer involved in transport of the protein (4ldb).

Transmission of Ebola virus

An outbreak of Ebola virus disease typically begins through human contact with an infected animal (eg, meat, body fluids). Once an individual becomes infected, the disease is then spread to others through direct contact with blood, body fluids, or the skin of patients with Ebola virus disease (as well as those who have died from the infection). Studies of nonhuman primates have found that animals can be infected with Ebola or Marburg virus through droplet inoculation of virus into the mouth or eyes. This suggests that cases of human infection can result from the inadvertent transfer of virus to these sites from the patient's own Ebola virus can also be spread through direct contact with skin of a patient, but the risk of developing infection from this type of exposure is lower than from exposure to body fluids. Virus present on the skin surface might result either from viral replication in dermal and epidermal structures, contamination with blood or other body fluids, or both. contaminated hands.





Ebola virus Pathogenesis

Ebola virus enters the body through mucous membranes, breaks in the skin, or parenterally. The pathogen infects many cell types, including monocytes, macrophages, dendritic cells, endothelial cells, fibroblasts, hepatocytes, adrenal cortical cells, and epithelial cells. Because of the difficulty of performing clinical studies under outbreak conditions, almost all data on the pathogenesis of Ebola and Marburg virus diseases have been obtained from laboratory experiments employing mice, guinea pigs, and a variety of non-human primates

Cell entry and tissue damage

Whatever the point of entry into the body, macrophages and dendritic cells are probably the first cells to be infected. Filoviruses replicate readily within these ubiquitous "sentinel" cells, causing their necrosis and releasing large numbers of new viral particles into extracellular fluid. Spread to regional lymph nodes results in further rounds of replication, followed by dissemination of virus to dendritic cells and fixed and mobile macrophages in the liver, spleen, thymus, and other lymphoid tissues. Rapid systemic spread is aided by virus-induced suppression of type I interferon responses.

As the disease progresses, hepatocytes, adrenal cortical cells, fibroblasts, and many other cell types also become infected, resulting in extensive tissue necrosis.

Macrophages infected with Ebola Zaire virus produce tumor necrosis factor (TNF)-alpha, interleukin (IL)-1beta, IL-6, macrophage chemotactic protein (MCP)-1, and nitric oxide (NO). These and other substances have also been identified in blood samples from Ebola-infected macaques and from acutely ill patients in Africa. Breakdown products of necrotic cells also stimulate the release of the same mediators. It is thus the host response to infection, rather than any toxic effect of the virus, that is responsible for the fever, malaise, vasodilatation, increased vascular permeability, hypotension, and shock of filoviral disease.

Coagulation defects

The coagulation defects seen in Ebola and Marburg virus disease are also induced indirectly. Virus-infected macrophages synthesize cell-surface tissue factor (TF), triggering the extrinsic coagulation pathway. Proinflammatory cytokines also induce macrophages to produce TF. The simultaneous occurrence of these two stimuli helps to explain the early appearance, rapid development, and ultimate severity of the coagulopathy in filovirus infection.

Impairment of adaptive immunity

Failure of adaptive immunity, through impaired dendritic cell function and lymphocyte apoptosis, helps to explain how these viruses are able to cause severe, frequently fatal illness.

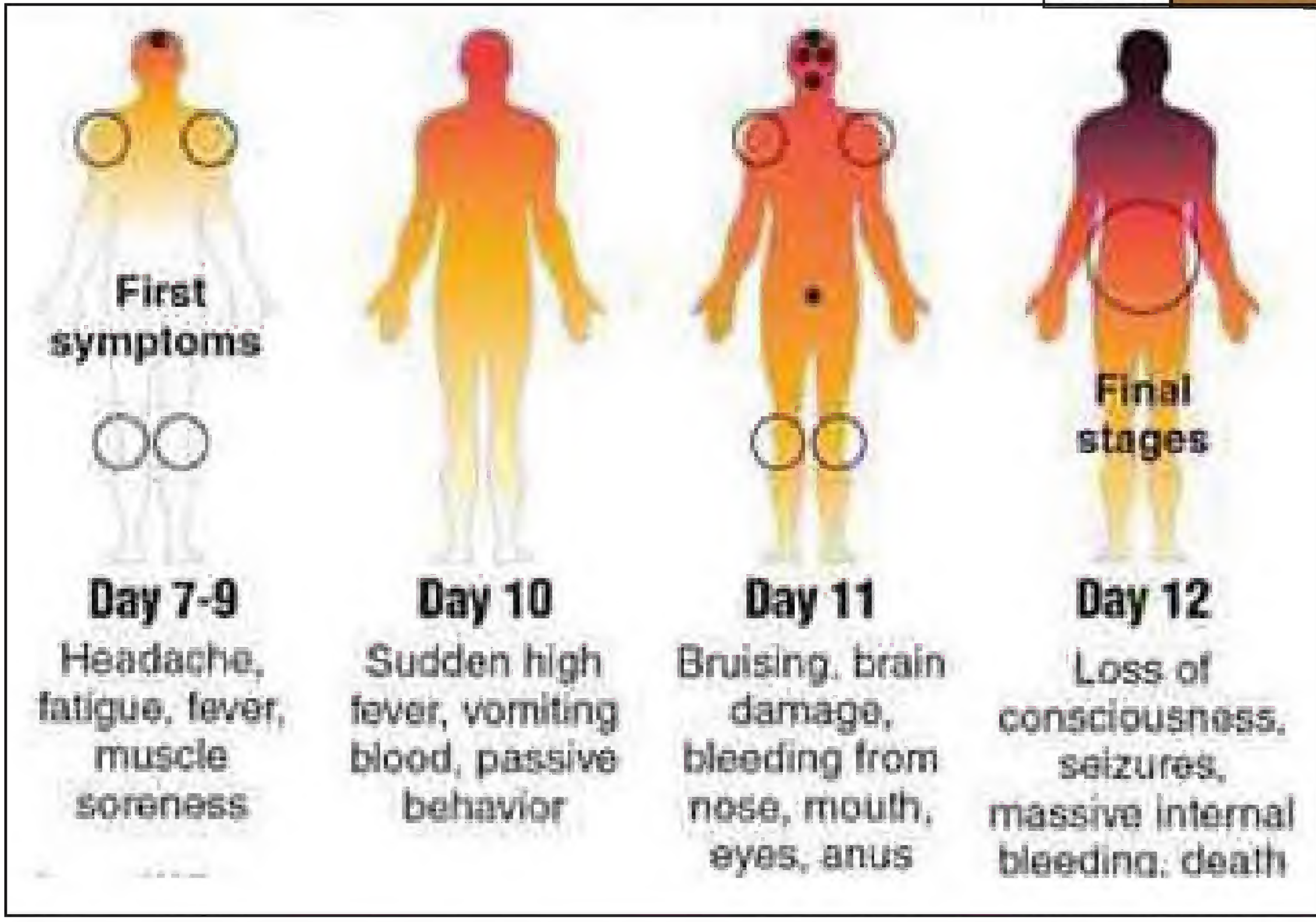
Filoviruses act both directly and indirectly to disable antigen-specific immune responses. Dendritic cells, which have primary responsibility for the initiation of adaptive immune responses, are a major site of filoviral replication. In vitro studies have shown that infected cells fail to undergo maturation and are unable to present antigens to naive lymphocytes, potentially explaining why patients dying from Ebola hemorrhagic fever do not develop antibodies to the virus. Adaptive immunity is also impaired by the massive loss of lymphocytes that accompanies lethal Ebola virus infection.

Lymphocytes remain uninfected, but undergo "bystander" apoptosis, presumably induced by inflammatory mediators and/or the loss of support signals from dendritic cells. A similar phenomenon is observed in septic shock. However, one study has shown that, at least in mice, virus-specific lymphocyte proliferation still occurs, in spite of the surrounding massive apoptosis, but it arrives too late to prevent a fatal outcome. Discovering ways to accelerate and strengthen such responses may prove to be a fruitful area of research.

Symptoms of Ebola virus disease

The incubation period, that is, the time interval from infection with the virus to onset of symptoms is 2 to 21 days. Humans are not infectious until they develop symptoms. First symptoms are the sudden onset of fever fatigue, muscle pain, headache and sore throat. This is followed by vomiting, diarrhoea, rash, symptoms of impaired kidney and liver function, and in some cases, both internal and external bleeding (e.g. oozing from the gums, blood in the stools). Laboratory findings include low white blood cell and platelet counts and elevated liver enzymes.

Patients with Ebola virus disease initially present with non-specific influenza-like symptoms and can progress to multiorgan failure and septic shock. The most common signs and symptoms reported from West



Africa during the 2014 outbreak include: fever (87 percent), fatigue (76 percent), vomiting (68 percent), diarrhea (66 percent), and loss of appetite (65 percent).

Important clinical findings of patients with Ebola and Marburg virus disease are as follows:

• **Nonspecific flu-like symptoms** — Ebola and Marburg hemorrhagic fever typically begin with the abrupt onset of fever, chills, and general malaise. Other signs and symptoms include weakness, anorexia, severe headache, and pain in the muscles of the trunk and lower back. High fever may be accompanied by relative bradycardia, as seen in typhoid fever. A nonproductive cough and pharyngitis, with the sensation of a lump or "ball" in the throat, are also frequently present.

• **Rash** — Some patients develop a diffuse erythematous, nonpruritic maculopapular rash by day five to seven of illness. The rash usually involves the face, neck, trunk, and arms, and can desquamate.

• **Gastrointestinal** — Gastrointestinal signs and symptoms usually develop several days after the initial presentation. These include watery diarrhea, nausea, vomiting, and abdominal pain.

• **Hemorrhage** — Bleeding is often not observed in the early phase of illness, but may manifest later in the course of disease as petechiae, ecchymosis/bruising, oozing from venipuncture sites, and/or mucosal hemorrhage. Frank hemorrhage is seen most commonly in the terminal phase of illness. During the outbreak in West Africa, approximately 20 percent of patients have unexplained bleeding, which is most commonly manifested as blood in the stool (about 6 percent).

• **Other findings** — Patients with Ebola virus disease can present with additional findings such as hiccups, chest pain, shortness of breath, headache, confusion, seizures, and/or cerebral edema. Conjunctival injection and dark red discoloration of the soft palate are common physical findings. Pregnant women may experience spontaneous miscarriages.

• **Leukopenia** — Leukopenia usually presents as lymphopenia and is then followed by an elevated neutrophil count, with an increased percentage of immature forms. As an example, in the 1967 Marburg outbreak, many patients had striking leukopenia with immature forms at the time of clinical presentation, with circulating white blood cell counts as low as 1000/microL. Immature granulocytes and abnormal lymphocytes, including plasmacytoid cells and immunoblasts, were seen in blood smears.

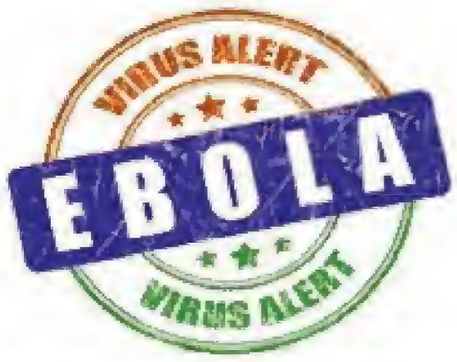
• **Thrombocytopenia** — Platelet counts are usually in the range of 50,000 to 100,000/microL. Platelet counts typically reach a nadir around day six to eight of illness.

• **Transaminitis** — Because filoviruses can cause multifocal hepatic necrosis, blood chemistry tests usually demonstrate elevated serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels, with the former typically increasing more than the latter. In the Marburg outbreak, aminotransferases rose rapidly on days six to eight and became highest in patients who died from infection.

• **Coagulation abnormalities** — Prothrombin (PT) and partial thromboplastin times (PTT) are prolonged and fibrin degradation products are elevated, consistent with disseminated intravascular coagulation (DIC). These changes are most prominent in severe and fatal cases.

• **Renal abnormalities** — Proteinuria is a common finding, and renal insufficiency occurs with progression of illness.

In non-fatal cases, patients typically improve approximately 6 days after the onset of symptoms. The formation of antigen-antibody complexes during recovery may cause acute arthralgias and other symptoms. Fatal disease has been characterized by more severe clinical signs early during infection and progression to multiorgan failure and septic shock. Death typically occurs between days 6 and 16.



Marburg viruses edit genetic material during infection

Using a laboratory technique called deep sequencing, investigators set out to investigate filovirus replication and transcription, processes involved in the virus life cycle. They studied the same Ebola virus species currently responsible for an outbreak in West Africa, and also analyzed a related filovirus, Marburg virus, that caused a large outbreak in Angola in 2005 and recently emerged in Uganda. The scientists infected both a monkey and human cell line with both viruses, and analyzed the genetic material produced by each virus, called RNA

Their results highlight regions in Ebola and Marburg virus RNAs where the polymerase of the virus (a protein that synthesizes the viral RNA) stutters at specific locations, adding extra nucleotides (molecules that form the building blocks of genetic material like DNA and RNA), thereby "editing" the new RNAs. The study found new features at a described RNA editing site in the Ebola glycoprotein RNA, which makes the protein that coats the surface of the virus. Their work also identified less frequent but similar types of editing events in other Ebola and Marburg virus genes -- the first time this has been demonstrated. Because of these messenger RNA modifications, Ebola and Marburg are potentially making proteins "that we previously didn't realize," said Christopher F. Basler, PhD, senior study author and professor of microbiology at Mount Sinai.

Journal Reference:
1.Reed S. Shabman, Omar J. Jabado, Chad E. Mire, Timothy B. Stockwell, Megan Edwards, Milind Mahajan, Thomas W. Geisbert, and Christopher F. Basler. Deep Sequencing Identifies Noncanonical Editing of Ebola and Marburg Virus RNAs in Infected Cells. mBio, November 2014 DOI: 10.1128/mBio.02011-14

Ebola outbreak

An outbreak of the deadly Ebola virus has killed at least 59 people in Guinea. Ebola is spread by close contact and kills between 25 and 90 percent of victims; there is no cure or vaccine.

A new strain of 'the virus'

While an Ebola epidemic has been raging in West Africa since March 2014, an outbreak of this hemorrhagic fever occurred in the Democratic Republic of the Congo (DRC) in August, leaving fears over the virus' spread to Central Africa. A new study confirms that it is an Ebola epidemic. However, this particular epidemic is due to a local strain of the virus, different from the one rife in the West of the continent. While this result shows the two epidemics are not linked, it illustrates the speed at which the disease has emerged. It is therefore urgent that we understand just how the disease is spread.

Journal Reference:
.Gaël D. Maganga, Jimmy Kapetshi, Nicolas Berthet, Benoît Kebela Ilunga, Felix Kabange M.D., Placide Mbala Kingebeni, Vital Mondonge, Jean-Jacques T. Muyembe, Eric Bertherat, Sylvie Briand, Joseph Cabore, Alain Epelboin, Pierre Formenty, Gary Kobinger, Licé González-Angulo, Ingrid Labouba, Jean-Claude Manuguerra, Jean-Marie Okwo-Bele, Christopher Dye, D. Phil., Eric M. Leroy. Ebola Virus Disease in the Democratic Republic of Congo. New England Journal of Medicine, 2014; 141021130018004 DOI: 10.1056/NEJMoa1411099

India Monitoring Possible New Ebola Victim From Japan

By Connor Adams Sheets

A Japanese tourist visiting India is reportedly suspected to have contracted the Ebola.

Yuko was planning to tour Manipur, but her trip was cut short when she began to exhibit symptoms of a potential Ebola infection. After tests for more common illnesses came up negative at Imphal's hospital, doctors sent blood samples to India's National Institute of Virology to be tested for Ebola, The Hindu reported.

"We are carefully screening all passengers coming from Ebola infected countries at the airport itself. As of today there is no suspected case of Ebola in India," the health minister said in Indore.

No Ebola case has been reported in India: Dr. Harsh Vardhan

Union Minister for Health Dr. Harsh Vardhan has clarified that India does not have any confirmed or even suspected Ebola virus affected person. The World Health Organisation (WHO) had informed that one Indian passenger had travelled on the same flight in which an Ebola virus patient (a foreign national) was travelling from Monrovia to Lagos. This Indian passenger is back in India. He has been tracked and his health is being regularly monitored. The Health Minister said, "We are happy to share that the person is healthy, fit and fine."

The government has already started the tracking passengers arriving from the affected countries by the Airport Health Organizations based on the information provided by Ministry of External Affairs. It is also tracking and monitoring the health of passengers, who travelled from the affected countries in their respective States, by the Integrated Disease Surveillance Programme.

The government has advised Indians against non-essential travel to the four West African countries –Guinea, Liberia, Sierra Leone and Nigeria — which form the epicentre of Ebola Virus Disease. Till late there are 1779 cases from Guinea, Liberia, Sierra Leone and Nigeria with 961 deaths. The Hindu, August 10, 2014 ■■■

Festive gift to Young Indian Researchers

It was started On 26th July 2014 when thusands of research scholars started protest aganist research hike in India. They gathered around DST, planned postcard greivance and various other modes to effectively pass their message to ministry of Science and Technology, India.

Withiin four months, the Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, MoS PMO, Personnel, Public Grievances and Pensions, Space and Atomic Energy, Dr. Jitendra Singh announced over 50% hike in the fellowship amount received by various categories of young Research scientists, here today. This land mark decision, responding to a long standing demand by around one lakh science Research Scholars and Associates working across the country.

Addressing a press conference, Dr. Jitendra Singh informed that the fellowship amount for Research Associate-III had been hiked from Rs.24000 to Rs.46000, Research Associate-II from Rs.23000 to Rs.42000, Research Associate-I from Rs.22000 to Rs.38000, Senior Research Fellow from Rs.18000 to Rs.30000 and Junior Research Fellow from Rs.16000 to Rs.25000 per month respectively.

Dr. Jitendra Singh recalled that as soon as he took over as Minister for Science & Technology four months back, the Research scholars had approached him with this demand, in response to which he had assured them that it is genuine and, being himself from the scientific fraternity, he could very well understand that a hike was richly deserved by Research Scholars and the Research Associates who devoted their entire time and energy to the growth of science in the country.

Designation & Qualification	Revised Emoluments per month
Junior Research Fellow (JRF) Post Graduate Degree in Basic Science with NET qualification or Graduate Degree in Professional Course with NET qualification or Post Graduate Degree in Professional Course	Rs.25,000/-
Senior Research Fellow (SRF) Qualification prescribed for JRF with two years of research experience	Rs.28,000/-

Category	Revised Emoluments per month
Research Associate –I	Rs.36,000/-
Research Associate –II	Rs.38,000/-
Research Associate –III	Rs.40,000/-

Rishi Verma
Hello Sir,.
Greetings..
Thanks for your great concern and untiring efforts for solving our issues of scholarship.
With all the respect but intense pain inside, me and several friends, unable to understand why M.Tech qualified students are not getting 50% hike as PROMISED. Earlier we are entitled for 18,000/- pm and after hike it becomes 25,000/-. This hike is less than 40%. Did we put our steps at wrong side by choosing acads? Did our decision to leave the offered job and join PhD was wrong?
Do the justice and kindly fulfil the promise...We should get the PROPER HIKED scholarship (50%)...

Vijay K VijayRaghavan
Dear Rishi, Please see my posts. MHRD will decide on MTechs soon. You make a great choice by going into academics. Cheers

Rishi Verma
Respected Sir..
Thanks for your kind concern and quick response at this late in night.
We will hope that MHRD will do the justice and fulfil the promise.
Regards.

Fellowship Revision Office Memorandum (OM)

What categories of research personnel do the OM on revision of fellowship cover?
The OM is applicable to Junior Research Fellows (JRF), Senior Research Fellows (SRF) and Research Associates (RA). Other designations such as Project Fellow, Project Assistant, DS Kothari Post doctoral fellow, Fast Track Young Scientist , Women Scientist etc. are not covered in the OM. Funding agencies concerned may consider revising the emoluments for these other categories also in view of the revision in fellowship for JRF, SRF and RA.

Is the OM is applicable to the Humanities and Social Sciences?
This OM is applicable only to Science and Professional degree holders and not to other disciplines such as Humanities and Social Sciences, Commerce, and Management.

What are the Professional degrees for the purpose of granting fellowship under this OM?
Degrees in Engineering/Technology, Medicine, Pharma, Veterinary and Agriculture.

What are NET examinations?
The previous (2010) OM mentioned only CSIR-UGC NET and GATE examinations. This has now been expanded. Now, any national level examinations conducted by the central government departments/agencies for admission to PhD
program are considered NET. The following are the list of NET Examinations (may not be comprehensive)

CSIR - CSIR – UGC National Eligibility Test
MHRD – Graduate Aptitude Test in Engineering Admission
DBT - Biotechnology Eligibility Test & Test conducted in Bioinformatics by Bioinformatics National Consortium

What about Non NET candidates?
The present OM does not cover candidates who are not qualified in any of the
NET examinations outlined above. DST is taking up enhancement for those in
Non-Net categories.

What about fellows drawing research fellowships under INSPIRE Scheme? Will it be applicable to them?
Not yet. DST is taking it up the matter separately.

Which are the Central Government Departments/agencies that will implement the OM.
The OM will be immediately implemented by the Departments under the Ministry
of Science and Technology (DST, DBT and DSIR). Other Ministries and Departments of Central Government such as MHRD, MoES, DAE, DoS, DRDO etc and agencies like ICMR, ICAR and Councils like CSIR will use it as guidelines, and adopt it (with modifications, if necessary) by following their internal approval mechanisms.

When will researchers start getting the revised fellowship amount?
The fellows getting stipend from DST and DBT will get it immediately, but for those getting emoluments from other departments/agencies, they will be informed by their respective funding agencies.

THE BIOTECH RESEARCH SOCIETY INDIA

XI Convention and ICETB 2014

inphoto: Professor Ashok Pandey, Founder President, BRSI, Professor P. Gunasekaran, President, BRSI, Professor Sudhir K. Sopory, Vice-Chancellor, JNU, New Delhi, Professor Lidia Szpyrkowicz, Italian Embassy, New Delhi, Dr. V.M. Katoch, Director- General, ICMR, Govt. of India, New Delhi (back).

The ICETB 2014 attracted around 600 participants across globe; 600 posters were presented during 4 day conference and several noted speakers presented their work in largest international conference of Indian Biotechnology.

We would like to thanks Prof Ashok Kumar Pandey for his kind help and support to allow us to attend this conference and arranging interviews with some notable personalities like I S Thakur from SES- JNU.

About the Conference

Prime motto of this international conference is to address the challenges in creating a more secure, sustainable and affordable system for food, feed, energy and health through consolidating the underpinning biotechnology research platforms. The BRSI annual conference prepares a ground for seeding new ideas and nurturing knowledge though critical analysis and unabridged discussions on biotechnological developments. The interactions among the participants from different spheres at the conference will serve to generate knowledge based research among the biotechnologists to assist in protecting the natural environment and developing environmentally sustainable industries and institutions. It will be a good opportunity to inform stakeholders and decision makers about the environmental impacts and societal implications of emerging biotechnologies. Nevertheless, the conference also aims to promote teaching methodology and research in a way to transform and aid economy.

About the Organisers

Jawaharlal Nehru University (JNU), New Delhi, India.

JNU was established in 1966 by an act of Indian parliament with the "Nehruvian" ideology. The University spreads over an area of 1000 acres on the Aravali ranges embraced by the beauty of lush green forest sustaining a birdwatcher's paradise and some forms of wild life. The University primarily has Post-graduate and Doctoral degree programmes imparting knowledge, education, high level of training with values and social commitment. The living ambience and social milieu of the campus is also reflected in an integrated, interdisciplinary approach in teaching and research.

School of Environmental Sciences (SES)

The School of Environmental Sciences (SES) was established in the lush green premises of JNU in 1974. SES has Postgraduate and Doctoral degree programmes. The School has

BRSI Affiliated publications

- Biochemical Engineering Journal
- Bioresource Technology
- Indian Journal of Experimental Biology
- Indian Journal of Biotechnology

"Among the important activities of the Society the most important has been the organization of its annual conventions, and to reach every part of the country enrolling the members."

diversified yet integrated interests in various research areas of physical, atmospheric, earth, chemical and biological aspects of the environment.

The Biotech Research Society, India

The Biotech Research Society, India is a non profit, scientific, professional society dedicated to promote excellence and competence in the field of biotechnology for the benifit of mankind. It enables interaction between academic institutes and biotech industries, to help them in resolving problems, as well make them aware of latest developments in biotech sector.The BRSI provides training in biotechnology, organizes lectures, seminars and symposia on scientific programs and societal missions.

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A Meta-analysis of the Impacts of Biotech Crops

Despite the rapid adoption of genetically modified (GM) crops by farmers in many countries, controversies about this technology continue. Uncertainty about GM crop impacts is one reason for widespread public suspicion. Wilhelm Klümper and Matin Qaim from the University of Goettingen (Germany) have carried out a meta-analysis of the agronomic and economic impacts of GM crops to consolidate the evidences. The analysis covers 147 original studies that were carried out internationally over the last 20 years. On average, GM technology adoption has reduced chemical pesticide use by 37%, increased crop yields by 22%, and increased farmer profits by 68%. Yield gains and pesticide reductions are larger for insect resistant crops than for herbicide tolerant crops. Yield and profit gains are higher in developing countries than in developed countries. The meta-analysis reveals robust evidence of GM crop benefits. Such evidence may help to gradually increase public trust in this technology.

The results were published recently in PLOS ONE. The open access article can be downloaded at: http://dx.plos.org/10.1371/journal.pone.0111629.

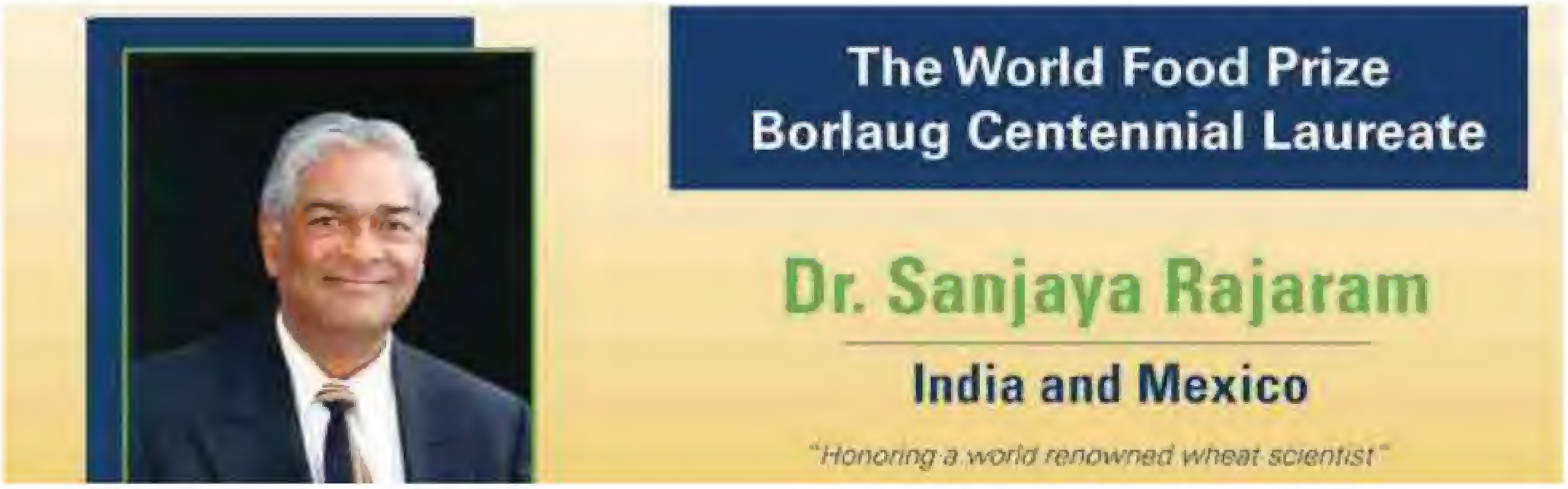
BBSRC Scientists Recommend Trait-based Assessment of Biotech Crops

The Biotechnology and Biological Sciences Research Council (BBSRC) released a position statement on new techniques on genetic improvement of crops together with GM regulations that can be adopted by the EU. BBSRC recommends trait-based system in assessment of GM crops, instead of focusing on the techniques used in the transformation because the boundaries between established genetic modification (GM) and non-GM techniques will become increasingly blurred as techniques develop. BBSRC also urged policy makers to be knowledgeable about the costs of not introducing proper regulatory processes.

Read the position paper at
http://www.bbsrc.com/web/FILES/Policies/genetic-crop-improvement-position-statement.pdf.

World Food prize 2014

Dr. Sanjaya Rajaram, a wheat scientist of India and Mexico, bred an impressive 480 varieties of wheat to provide nutritious grains resistant to rust disease and adaptable in a vast array of climates, which have helped protect the global food supply and feed more people.



Dr. Rajaram's scientific research led to a prodigious increase in world wheat production – by more than 200 million tons. His crossing of winter and spring wheat varieties, which were distinct gene pools that had been isolated from one another for hundreds of years, led to his development of plants that have higher yields and dependability under a wide range of environments around the world. He also developed wheat varieties resistant to the rust disease that can wipe out entire fields, thus protecting the world's food supply.

"This award honors the resilience and innovative spirit of farmers in the developing world and the national agricultural systems," Dr. Rajaram said as he accepted the award. "Without their contributions my research would not have been possible. The mission was – and the mission remains - to serve them."

"Dr. Rajaram worked closely with Dr. Borlaug,founder of World Food prize, succeeding him as head of the wheat breeding program at CIMMYT in Mexico, and then carried forward and expanded upon his work, breaking new ground with his own invaluable achievements. His breakthrough breeding technologies have had a far-reaching and significant impact in providing more food around the globe and alleviating world hunger," said Amb. Kenneth M. Quinn, President of The World Food Prize. "Dr. Borlaug himself called Dr. Rajaram 'the greatest present-day wheat scientist in the world' and 'a scientist of great vision.' It is an honor to recognize Dr. Rajaram today for his development of an astounding 480 varieties of wheat, bred to offer higher yields, resistance to the catastrophic rust disease, and that thrive in a wide array of climates."

Born in a small village in India, Dr. Rajaram worked to be the top in his class as he moved through school, and dedicated his life to making direct improvements for farmers and all people who depend on agriculture. Now a citizen of Mexico, Dr. Rajaram conducted the majority of his research in Mexico at the International Maize and Wheat Improvement Center (CIMMYT).

Dr. Rajaram succeeded Dr. Norman Borlaug in leading CIMMYT's wheat breeding program, and developed an astounding 480 wheat varieties that have been released in 51 countries on six continents and have been widely adopted by small- and large-scale farmers alike. Dr. Rajaram is currently the Director of Resource Seeds International and a consultant to International Center for Agricultural Research in the Dry Areas (ICARDA).

Combined behavioral support, medication offers smokers best chance of quitting

Numerous randomized clinical trials have shown the effectiveness of the two major forms of smoking cessation treatment -- behavioral support and medication -- in helping smokers quit. Researchers have now demonstrated that this approach can successfully translate to the "real world" and that a combination of the two treatments offers almost a threefold chance of success over attempts to quit without using a cessation aid.

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"Randomized clinical trials have a high internal validity, but because they are conducted under very strict conditions, they do not reflect the real world in which these treatments are supposed to be used," explains Daniel Kotz, PhD, from the University of Maastricht in the Netherlands. "We therefore conducted a study to compare the various smoking cessation methods in the real world."

Investigators conducted a prospective cohort study in a random sample of 1,560 adult smokers who took part in an English national household survey between November 2006 and March 2012. They used data from the Smoking Toolkit Study, an ongoing research program designed to provide information about smoking cessation and factors that promote or inhibit it at a population level.

Smokers were included in the study when they were smoking tobacco at the time of an initial interview, responded to a questionnaire six months later, and made at least one quit attempt during the study period. The smokers each used one of the following four cessation aids: prescription medication (nicotine replacement therapy, bupropion, or varenicline) in combination with specialist behavioral support delivered by a UK National Health Service Stop Smoking Service (4.8%); prescription medication with brief advice (20.8%); nicotine

replacement therapy bought over the counter (29.9%); or none of these (44.5%).

A total of 23% reported not smoking at the end of the six-month period. The investigators found that smokers who used a combination of specialist behavioral support and medication in their quit attempts reported higher levels of urges to smoke than did smokers who tried to quit unaided. After adjusting for this, they found smokers using the combination approach had almost three times the odds of success than did those who used neither medication nor behavioral support. A combination of prescription medication along with limited behavioral support was also more effective than unaided quitting. They found however that smokers who bought nicotine replacement therapy (NRT) over the counter with no behavioral support had a reduced success rate.

"As far as we are aware, our study is the first prospective cohort study comparing prescription medication when offered with specialist behavioral support with prescription medication offered without such support. A major strength of our study is the use of a representative sample of the English population that was sufficiently large to detect an effect of specialist behavioral support despite its low prevalence," says Dr. Kotz. "The results clearly show that the combination of prescription medication with behavioral support is the most successful method. More smokers should be guided towards these forms of treatment."

"Tobacco use continues to be prevalent and deadly in the United States and worldwide. Further, smoking cessation is one of the most important health behavior changes that we can encourage in our patients. Hundreds of clinical trials that included thousands of patients have demonstrated the efficacy of combined behavioral therapy and pharmacotherapy for tobacco-dependence treatment," comments J. Taylor Hays, MD, Director of the Mayo Clinic Nicotine Dependence Center in Rochester, Minnesota "The research by Dr. Kotz and his colleagues demonstrates that this approach can be translated to the real world and provide real benefit. This is a case where there is happily little difference between 'theory and practice.' Health systems, hospitals, clinics, and providers now need to practice the well-established standard of care to save real lives in their real world."

Journal References:

Daniel Kotz, Jamie Brown, Robert West. Prospective Cohort Study of the Effectiveness of Smoking Cessation Treatments Used in the "Real World". Mayo Clinic Proceedings, 2014; 89 (10): 1360 DOI: 10.1016/j.mayocp.2014.07.004

J. Taylor Hays. Helping Smokers Quit in the "Real World". Mayo Clinic Proceedings, 2014; 89 (10): 1328 DOI: 10.1016/j.mayocp.2014.08.009

■ ■ ■

Blood tests predict kidney disease patients' risk of developing heart failure

October 2, 2014

Kidney disease patients with detectable levels of a blood protein called high-sensitivity troponin T had up to a 5-fold increased risk of developing heart failure, research shows. Those with high levels of a protein called N-terminal pro-B-type natriuretic peptide had a nearly 10-fold increased risk of developing heart failure.

Two blood markers are strongly linked with the development of heart failure in individuals with mild to severe kidney disease, according to a study appearing in an upcoming issue of the Journal of the American Society of Nephrology (JASN). Elevations in these markers may indicate subclinical cardiovascular changes that subsequently contribute to the development of heart failure.

Patients with chronic kidney disease (CKD) are at increased risk of developing heart failure and other cardiovascular diseases. Nisha Bansal, MD, MAS (University of Washington) Amanda Anderson, PhD, MPH (University of Pennsylvania), and their colleagues conducted a study to see if certain blood tests might help identify patients at especially high risk. These tests -- which measure proteins called high-sensitivity troponin T (hsTnT) and N-terminal pro-B-type natriuretic peptide (NT-proBNP) -- strongly predict heart failure in the general population, but their predictive utility in patients with CKD is unknown. The researchers studied 3483 patients with CKD in the Chronic Renal Insufficiency Cohort (CRIC) Study who were recruited from June 2003 to August 2008 and were free of heart failure when they enrolled. Patients were followed for a

median of nearly 6 years.

Compared with participants with the lowest levels of hsTnT at the start of the study, those with the highest hsTnT levels had a nearly 5-fold higher risk of developing heart failure. Those with the highest NT-proBNP levels had a nearly 10-fold higher risk of developing heart failure compared with those with the lowest levels.

"This research is important in that it may advance the application of widely available cardiac biomarkers to identify CKD patients at the highest risk of developing heart failure, the most common cardiovascular complication in this patient population," said Dr. Bansal. "These findings suggest that hsTnT and NT-proBNP may represent distinct biological pathways that likely involve subclinical changes in the structure and function of the heart," said Dr. Anderson.

Journal Reference:
N. Bansal, A. Hyre Anderson, W. Yang, R. H. Christenson, C. R. deFilippi, R. Deo, D. L. Dries, A. S. Go, J. He, J. W. Kusek, J. P. Lash, D. Raj, S. Rosas, M. Wolf, X. Zhang, M. G. Shlipak, H. I. Feldman. High-Sensitivity Troponin T and N-Terminal Pro-B-Type Natriuretic Peptide (NT-proBNP) and Risk of Incident Heart Failure in Patients with CKD: The Chronic Renal Insufficiency Cohort (CRIC) Study. Journal of the American Society of Nephrology, 2014; DOI: 10.1681/ASN.2014010108 ■ ■ ■

How powerful antibiotics are made

University of Illinois graduate research assistant Manuel A. Ortega, chemistry professor Wilfred van der Donk, graduate student Yue Hao, biochemistry professor Satish Nair and postdoctoral researcher Mark Walker solved a decades-old mystery into how a broad class of natural antibiotics are made.

Researchers report in the journal Nature that they have made a breakthrough in understanding how a powerful antibiotic agent is made in nature. Their discovery solves a decades-old mystery, and opens up new avenues of research into thousands of similar molecules, many of which are likely to be medically useful.
The team focused on a class of compounds that includes dozens with antibiotic properties. The most famous of these is nisin, a natural product in milk that can be synthesized in the lab and is added to foods as a preservative. Nisin has been used to combat food-borne pathogens since the late 1960s.

Journal Reference:
1.Manuel A. Ortega, Yue Hao, Qi Zhang, Mark C. Walker, Wilfred A. van der Donk, Satish K. Nair. Structure and mechanism of the tRNA-dependent lantibiotic dehydratase NisB. Nature, 2014; DOI: 10.1038/nature13888 ■ ■ ■

Lessons from 'Spanish flu,' nearly 100 years later

October 22, 2014

Just in time for flu season, a new study of 'the mother of all pandemics' could offer insight into infection control measures for the flu and other epidemic diseases. Researchers studied the evolution of the 1918 influenza pandemic, aka the "Spanish flu." In 1918, the virus killed 50 million people worldwide, 10 to 20 million of whom were in India. In the United States alone, the Spanish flu claimed 675,000 lives in nine months.

Siddharth Chandra, director of MSU's Asian Studies Center and professor in MSU's James Madison College, and Eva Kassens-Noor, assistant professor of urban and transport planning with a joint appointment in the Global Urban Studies Program, studied the evolution of the 1918 influenza pandemic, aka the "Spanish flu." In 1918, the virus killed 50 million people worldwide, 10 to 20 million of whom were in India. In the United States alone, the Spanish flu claimed 675,000 lives in nine months.

"We need to pay more attention to public health," Chandra said. "If we get another flu pandemic and it infects tens of millions in the U.S., killing half a million people, that's going to be worse than anything that's happened to us in at least the last 50-to-100 years."

Chandra and Kassens-Noor studied weekly death rates in 213 districts from nine provinces in India, information contained in reports from the sanitary commissioner's office. According to their research, the virus entered India in Bombay, which experienced a three-week flu wave and a peak death rate of 54.9 people per 1,000. As it spread east, the flu epidemic lengthened to eight weeks and fewer people died.

Simply put: When the flu hit, it hit hard and fast.

"This has all sorts of implications for pandemics that are happening now or might be threatening to happen," Chandra said. "In scenarios resembling the 1918 pandemic as it unfolded in India, locations close to an entry point will have extremely short windows of time to deal with a virulent pathogen, placing emphasis on the emergency management of

a short and severe wave of illness."

Possibly a severe wave like the Ebola virus in West Africa, he said.

According to the World Health Organization, there have been 9,216 confirmed, probable and suspected cases of Ebola in seven countries and 4,555 deaths. While Chandra acknowledges Ebola is far less contagious than the flu, and it's not moving as quickly, if there had been 9,000 cases of the 1918 flu, there would've been fewer than 900 deaths.

"One of the things this research could shed light on: Are viruses like the Ebola virus going to get less virulent or more virulent as they move on?" he said.

Economically, an epidemic of any sort would wreak havoc. Chandra, an economist, said that if the United States lost 1 million people, who produce an average of about $50,000 in gross domestic product each, the country would lose about $50 billion in productivity. Not to mention, the movement of goods and services could stop, as could public transportation, he said.

The study was published in the most recent edition of the journal BMC Infectious Diseases as an "Editor's Pick."

Journal Reference:
Siddharth Chandra, Eva Kassens-Noor. The evolution of pandemic influenza: evidence from India, 1918–19. BMC Infectious Diseases, 2014; 14 (1): 510 DOI: 10.1186/1471-2334-14-510

Genome of coffee discovered

The coffee tree genome has been sequenced. By using several sequencing technologies, researchers coordinated the mapping of the DNA sequence for the coffee tree, assembled in large fragments able to be used in various types of analysis. The team then anchored these sequence fragments to a high-density genetic card to reconstruct the pseudo-chromosomes. A catalogue of genes and repeated sequences was then created and validated, allowing for a comparison with other plants.

An international study coordinated by researchers from IRD, the CEA (Genoscope), CIRAD, the CNRS, and the University of Buffalo (United States), and involving many laboratories, helped identify a reference genome sequence for coffee trees for the first time. This discovery is important in two ways: first, it is fundamental as it improves understanding of the organisation of the genome, its function, and its evolution; secondly, it also offers new possibilities for selection or improvement of coffee tree varieties.

Journal Reference:
1.F. Denoeud, L. Carretero-Paulet, A. Dereeper, G. Droc, R. Guyot, M. Pietrella, C. Zheng, A. Alberti, F. Anthony, G. Aprea, J.-M. Aury, P. Bento, M. Bernard, S. Bocs, C. Campa, A. Cenci, M.-C. Combes, D. Crouzillat, C. Da Silva, L. Daddiego, F. De Bellis, S. Dussert, O. Garsmeur, T. Gayraud, V. Guignon, K. Jahn, V. Jamilloux, T. Joet, K. Labadie, T. Lan, J. Leclercq, M. Lepelley, T. Leroy, L.-T. Li, P. Librado, L. Lopez, A. Munoz, B. Noel, A. Pallavicini, G. Perrotta, V. Poncet, D. Pot, Priyono, M. Rigoreau, M. Rouard, J. Rozas, C. Tranchant-Dubreuil, R. VanBuren, Q. Zhang, A. C. Andrade, X. Argout, B. Bertrand, A. de Kochko, G. Graziosi, R. J. Henry, Jayarama, R. Ming, C. Nagai, S. Rounsley, D. Sankoff, G. Giuliano, V. A. Albert, P. Wincker, P. Lashermes. The coffee genome provides insight into the convergent evolution of caffeine biosynthesis. Science, 2014; 345 (6201): 1181 DOI: 10.1126/science.1255274

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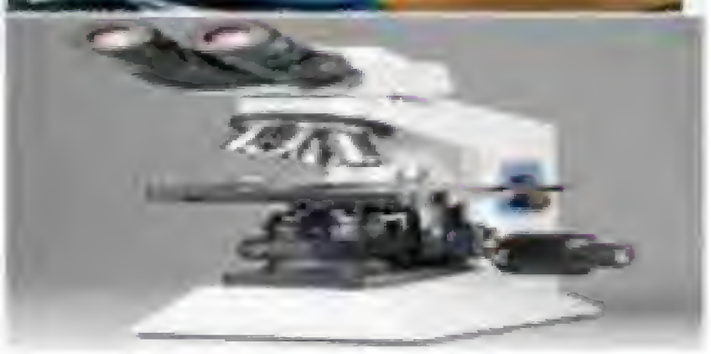

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Four point about Biological clocks/ circadian Rhytm

Mike Sesma of the National Institutes of Health tracks circadian rhythm research being conducted in labs across the country, and he shares a few timely details about our internal clocks:

1. They're incredibly intricate. Biological clocks are composed of genes and proteins that operate in a feedback loop. Clock genes contain instructions for making clock proteins, whose levels rise and fall in a regular cyclic pattern. This pattern in turn regulates the activity of the genes. Many of the results from circadian rhythm research this year have uncovered more parts of the molecular machinery that fine-tune the clock.

2. Every organism has them -- from algae to zebras. Many of the clock genes and proteins are similar across species, allowing researchers to make important findings about human circadian processes by studying the clock components of organisms like fruit flies, bread mold and plants.

3. Whether we're awake or asleep, our clocks keep ticking. While they might get temporarily thrown off by changes in light or temperature, our clocks usually can reset themselves.

4. Nearly everything about how our body works is tied to biological clocks. Our clocks influence alertness, hunger, metabolism, fertility, mood and other physiological conditions. For this reason, clock dysfunction is associated with various disorders, including insomnia, diabetes and depression. Even drug efficacy has been linked to our clocks: Studies have shown that some drugs might be more effective if given earlier in the day.

Learn more:
Circadian Rhythms Fact Sheet: http://www.nigms.nih.gov/Education/Pages/Factsheet_CircadianRhythms.aspx

Fierce or friend; Let it decide by genes

After many generations, rats bred for their bad attitude behave differently from those selected for a calm demeanor around humans. Research published November 7 in the journal Genetics identifies gene regions that contribute to differences between nasty and nice rats in their behavior and the activity of genes in the brain. These results may provide important clues as to which genes make tame animals like dogs behave so differently from their wild ancestors.

"Tameness is one trait that all domestic animals share. Whether it's pigs or cats or horses, domestication changed species that used to fear humans into animals that now tolerate and even trust us. This research is an important step in uncovering the genetic basis of such remarkable transformations," said co-author Henrike Heyne, of the Max Planck Institute for Evolutionary Anthropology and the University of Leipzig in Germany.

The rats in the study are descendents of an experiment initiated more than forty years ago by Dmitry K. Belyaev, who is famous for his work on experimental domestication of foxes. Belyaev and his colleagues collected around 200 wild rats and divided them into two groups. In one group, the rats selected for breeding were the most aggressive of the bunch--those most likely to attack or show fear towards an approaching human hand. In the second group, only the tamest rats were bred. After repeating this process for more than sixty generations, rodents in the two groups reacted to humans very differently.

"Rats from the tame group allow you to pick them up and will sometimes even approach your hand on their own. In contrast, the aggressive rats immediately attack you or try to escape," said co-author Frank Albert of the Max Planck Institute for Evolutionary Anthropology and the University of California, Los Angeles.

To find gene variants responsible for these heritable behavior differences, the researchers crossed rats from each of the two groups to create a population of hybrids. These hybrid animals showed a wide range of behaviors and inherited a random mix of genetic variants from the original tame and aggressive parent rats. By combining information on the genes and the behavior of each hybrid, the team identified eight regions of the genome that contributed to the variation in tameness.

Within these broad regions, Heyne and colleagues looked for specific genes of interest by analyzing their activity in the brain. Eleven of the genes within these regions carried variants that made them more active in the brains of aggressive rats compared to tame rats, or vice versa. For five of these genes, the team found additional evidence that the variants regulating activity of the gene were the same variants that influenced behavior.

These five genes may play key roles in shaping behavior in the two populations. Several of the genes are involved in nervous system development and one, Slc17a7, has previously been implicated in fear and stress behavior in mice. Further experiments will be required to determine which genes contribute significantly to tameness or aggression.

Journal Reference:
1.H. O. Heyne, S. Lautenschlager, R. Nelson, F. Besnier, M. Rotival, A. Cagan, R. Kozhemyakina, I. Z. Plyusnina, L. Trut, O. Carlborg, E. Petretto, L. Kruglyak, S. Paabo, T. Schoneberg, F. W. Albert. Genetic Influences on Brain Gene Expression in Rats Selected for Tameness and Aggression. Genetics, 2014; DOI: 10.1534/genetics.114.168948

Europe's Leading Plant Scientists Call to Stop Blocking GM Trials

More than 20 of Europe's most prominent plant scientists signed a joint letter warning that Europe may lose its research lead unless plant science is adequately funded. The most influential plant scientists from Germany, Switzerland, the United Kingdom, Austria, Netherlands, Belgium, and Sweden are concerned that European basic and applied plant science may be relegated to a second tier status.

The signatories are concerned that Europe may fall short on its current 'Horizon 2020' goals of producing "world-class science" and removing "barriers to innovation" unless European policymakers take a more pro-science stance. The scientists state that the current EU "de facto moratorium on transgenic plant approvals has been detrimental for applied plant science and has effectively eliminated possibilities for publicly funded scientists and small companies to address the big challenges for society."

The open letter calls for a fundamental revision of GM regulation, and warns that "in most European countries permits to perform field experiments with transgenic plants are blocked, not on scientific but on political grounds," and that where field experiments are permitted "these are often systematically vandalized, causing huge scientific and financial losses," hampering scientific efforts to tackle agricultural pests and respond to climate change. They reveal that "some of us have even been threatened and had private property vandalized."

The open letter is available at: http://www.umu.se/digitalAssets/151/151958_open-letter-to-decision-makers-in-europe.pdf. For more details, read the news release at: http://www.umu.se/english/about-umu/news-events/news/newsdetailpage/europes-leading-plant-scientists-call-for-urgent-action-to-defend-research.cid242017.

NEWS???- Read Biotech Express

Experts Call on the Commonwealth Parliamentarians to Adopt New Technologies in Agri

The Commonwealth Parliamentary Association (CPA) organized a three-day workshop of the Parliamentary Agriculture Committees from India, Africa, and South Asia Regions last October 29-31, 2014 at the Punjab Legislative Assembly, Chandigarh, India.

The workshop was inaugurated by the Chief Minister of Punjab Sh Prakash Singh Badal, Speaker of the Punjab Legislative Assembly Dr. Charnjit Singh Atwal, and Honorable Speaker of Indian Lok Sabha Smt. Sumitra Mahajan. It was attended by leaders of Parliamentary Agriculture Committees, legislatures and delegates from Bangladesh, Pakistan, Malaysia, Maldives, Sri Lanka, Tanzania, and Uganda.

The workshop aimed to devise ways to increase food productivity and achieve food security. Discussions stressed that technical innovations are vital to meet today's challenges of food security and that countries should focus on crop improvement and on sustainable use of resources. Other issues tackled include the myths and realities of GM crops, safety of GM food and the parliamentary agricultural committees' role in strengthening the agriculture sector.

Present were Dr. BS Dhillon, Vice Chancellor of Punjab Agricultural University, Ludhiana; Mr. Tony Worthington of University of Greenwich; Dr. Charnjit Singh Atwal, Speaker of the Punjab Legislative Assembly; Prof. IS Dua of Punjab University; and Mr. Bhagirath Choudhary, Director of ISAAA South Asia Centre ■

Production of Single Cell Proteins from Spirulina and its Importance in Larval Nutrition of fish

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Introduction

The dehydrated cells of microorganisms (algae,bacteria,fungi) used as food or fish feed are collectively known as "microbial protein. The term 'microbial protein' was replaced by a new term called 'single cell protein' during the first international conference on microbial protein held in 1967 at the Massachusetts Institute of Technology(MIT),Cambridge. The term single cell protein (SCP) refers to the mixed protein extracted from pure or mixed culture of algae, yeasts, fungi, or bacteria used as a substitute for protein rich food in humans and animal feeds. Use of microbes as food source may appear to be unacceptable to some people but the idea of consumption of microbes as food for man and animals is certainly innovative to solve the global food problem (Manju, 1991). Algae, fungi and bacteria are the chief of microbial protein that can be utilized as a protein supplement for the larva of fish. The production of such fish feed which can enhance the faster growth of fish became the considerable focus in the area of research on fish larval nutrition. According to Mithun 2005 SCP diet exhibited a remarkable increase in growth and better conversion ration ratio as compared to the other diets. Here it is very clear

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that microbial SCP can serve to supply essential proteins to increase the survival and growth of Xiphophorus maculates.The protein especially in fish meal act as feed for aquaculture systems which is highly cost and is mandatory ingredient. Since the supply of fish meal has become uncertain, it is of great importance to replace the fish meal to a minimum possible extent in fish rations. Among unconventional protein sources, SCP of microbial origin appears to be a promising substitute for fish meal, which can replace up to 25 – 50% fish meal (Dhevendaran et al, 2013).SCP is gaining popularity day by day because they require limited land area for growth and alsohelp in recycling of waste. According to Ashok, et al., (2000), application of agro-industrialresidues in bioprocesses such as cultivation of SCP on the one hand provides alternativesubstrates, and on the other hand helps in solving pollution problems, which their disposal mayotherwise cause.In developing SCP processes new technical solutions for other related technologies have been discovered, e.g. in wastewater treatment, production of alcohol and other metabolites, enzyme technology and nutritional sciences.

Production of SCP from spirulina: Spirulina is a cyanobacterium that can be consumed by humans and other animals and is made primarily from two species of cyanobacteria: Arthrospira platensis and Arthrospira maxima.

Major constituent %		Essential amino acids %		Minerals		Vitamins	
Crude proteins	65	Lysine	2.99	Ca	6.6mg	Biotin	0.2%
Carbohydrate	16	Cystine	0.47	P	0.9gm	Cyanocobalamin	66.0mg
Lipids	6.7	Methionine	1.38	Fe	4mg	Folic acid	18.0mg
Nucleic acids	4.2	Phenylalanine	2.87	Na	0.8mg	Riboflavin	1.8mg
		Threonine	3.04	K	1.3mg	Thiamin	0.12mg
						Tocopheol	0.81IU
Table 1						β-carotene	320,000IU

Table- 1 Nutritional fact of spirulina

Mass culture of Spirulina

Spirulina is cultured in large scales in artificial ponds or tanks and oxidation ponds. The culture can be open type culture, and closed type Culture.

Open circulating system- An open circulating system is a man made open tank or shallow pond.It may be circular or rectangular in shape.The depth of the tank should be in between 25 and 30 cm. Size of the tank may be 500m^2-500m^2. It is built with brick or concrete and the interior is lined with a sheet of polyvinyl chloride (PVC). In circular tanks a stirrer with a rotating arm is kept at the centre to provide enough stirring for the culture. Usually the culture tanks are kept open while functioning. Sometimes, they may be covered with a transparent glass or plastic sheet to preventcontamination.

Media used for the culture of Spirulina-Liquid effluents taken from well digested human excreta; modified sea water and Zarrouk medium are used for this purpose. Human excreta is diluted and digested in a digester at 55˚C for 10 days. Liquid effluent is then taken from the digester and filtered through a fine cloth to get filtrate. The filtrate is again filtered through a sand bed filter to remove the contaminants. The final filtrate is used as a medium for spirulina culture.

Requirements for the culture of spriulna

Algal tanks: For the culture of spriulna generally, circular or rectangular cemented tanks are used. The circular tanks are more preferred compared to rectangular because of ease in handling. Size of the tank may be according to convenience and yield requirements. Depth should be about 25cm.

Light: the low light intensity is required of the growth of

spriulna
Temperature: the optimum temperature required between 35-40 oC
pH: the sprulna are grow at high pH ranging from 8.5 to 10.5. Initially, culture should be maintained at pH 8.5 which automatically is increase to 10.5.

Factors Affecting Biomass Production of spriulina

1.Illumination time
2.Light intensity
3.Supply of CO2
4.Nitrogen sources
5.Agitation of growing cells to maintain cells in suspension.

Harvesting of Spirulina cells: Spirulina filaments develops gas vacuoles in the cells and hence they float on the surface of culture medium,As the density increases, a dense bluish green mat develops on the surface of the culture media, the biomass is harvested by filtration using a fine mesh or cloth.

Drying and packing Spirulina cells: The harvested biomass of Spirulina cells is washed with an acid water pH about 4 to remove toxic pollutants. Then, it is again washed with tap water to remove the acidity of the acid water. Then washed biomass Spirulina cells is spread on a polythene sheet in the sunlight for drying. During drying thin flakes of Spirulina cells develops on the plastic sheet. The dried flakes Spirulina cells collected and made into powder. The dried Spirulina cells are packed in aluminum lined bags or sealed bottles for marketing.

Importance of single cell protein in Larval Nutrition of fish:

Aquatic health benefits: The role of single cell protein in disease management should be on prevention, which is likely to be more cost-effective than cure So far, the conventional approaches, such as the use of disinfectants and antimicrobial drugs, have had limited success in the prevention or cure of aquatic diseases(Das 2006).

Minerals: The spirulina comes from waters with minerals deposited from ancient soils and mountains that no other plants can live there. Due to the fact that spirulina thrives in such alkaline waters, it incorporates many minerals and minerals derivative compounds into its cell structure. Fish can ingest high amounts of added inorganic minerals without benefit to health because the fish body does not know what to do with these incompatible forms.

Role of Spirulina cell in building of red blood cells (RBC) and stem cells: Spirulina is very rich in a brilliant blue polypeptide called Phycocyanin. Studies show that Phycocyanin affects the stem cells found in bone marrow of human. Stem cells are "Grandmother" to both the white blood cells that make up the cellular immune system and red blood cells that oxygenate the body. "Chinese scientists document phycocyanin stimulating hematopoiesis, emulating the affect of the hormone erythropoietin, (EPO).

Abilities of spirulina in anti-viral and anti-cancer: Several studies show that the spirulina or its extracts can prevent or inhibit cancers in humans, animals, and fish. Some forms of cancer are the result of damaged cell DNA "out of control", causing uncontrolled cell growth. The Cellular biologists have defined a system of special enzymes called end nuclease which repair damaged DNA to keep cells alive and healthy. When these enzymes are deactivated by oxidation, radiation or toxins, errors in DNA go un-repaired and, cancer may develop.

Role of spirulina cells in enhancing the color of ornamental fishes: Fish species vary greatly in terms of the type of carotenoid pigments they can use, and how they individually exhibit these coloring agents in their skin. Spirulina is the natural foods have the highest in carotenoid pigments, some 20 times the amount found in carrots. Spirulina contains at least six forms of carotenoid pigment providing a "rainbow" of color potential. When a fish feeding with a food containing Spirulina, we will see better colorations within a few weeks. Spirulina is a rich source of A and B vitamins, especially B-12, and naturally chelated and bio-available calcium and iron.

Increased Survival rates of fish larva: Studies in Japan on marine yellowtail showed that fingerlings fed at the ratio of 0.5% spirulina resulted in a significant gain in survival over the non-spirulina fed group. Similar results were obtained from professional discus fish breeders who incorporated spirulina powder into the diet for newborn discus fry.

Requirements of less medication in fishes: Fish farmers have found that including spirulina in the diet reduced the amount of medication or therapeutics that is normally required to treat sick of fish. Spirulina also reduced toxicity of medications. Most of the disease treatments on the market are "water baths" in which the fish must absorb the drug from the aquarium water. The Orally feeding fish a

diet containing spirulina could effectively reduce or eliminate the need for bath treatments. Using spirulina algae as a "prophylactic" treatment in place of antibiotics can effectively reduce wastewater pollutants, eliminating costly treatment systems and increasing the effectiveness of existing systems.

Uniform growth rates in fishes: When fish are fed with the spirulina at therate 0.5-4.0% inclusion, there is an increase in fat transporting enzymes which results in reduced fat storage in flesh, nutrient utilization and improved utilization of fat for growth.

Intestinal micro flora in fish: Spirulina improves the intestinal micro flora in fish by the breaking down of otherwise indigestible feed components, thereby extracting more nutrition from the feed. The same beneficial micro flora or bacteria produce vitamins and displace harmful substances.

Conclusion

The use of microbes as food source may appear to be unacceptable to some people but the idea of consumption of microbes as food for man and animals is certainly innovative to solve the global food problem. Single cell protein recently attracted attention and holds a majorpotential for increasing protein supply.The protein obtained from microbialsource is designed as SCP. Bacteria, Moulds, Yeasts, Green and Bluegreenalgae are widely used as source of single cell protein. However, blue-green algae, wherecell wall lacks cellulose, are easily digestible and are the most frequently used organism. Single cell protein can be produced by different method but most common are used are open circular tnak method. Spirulina is a cyanobacterium that can be consumed by humans and other animals. The feeding with the sprulna in larval diet showed the very good results. The fish fed with a spirulina showed the Uniform growth rates.

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CONFERENCES

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in Life Sciences

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Hardeep Singh
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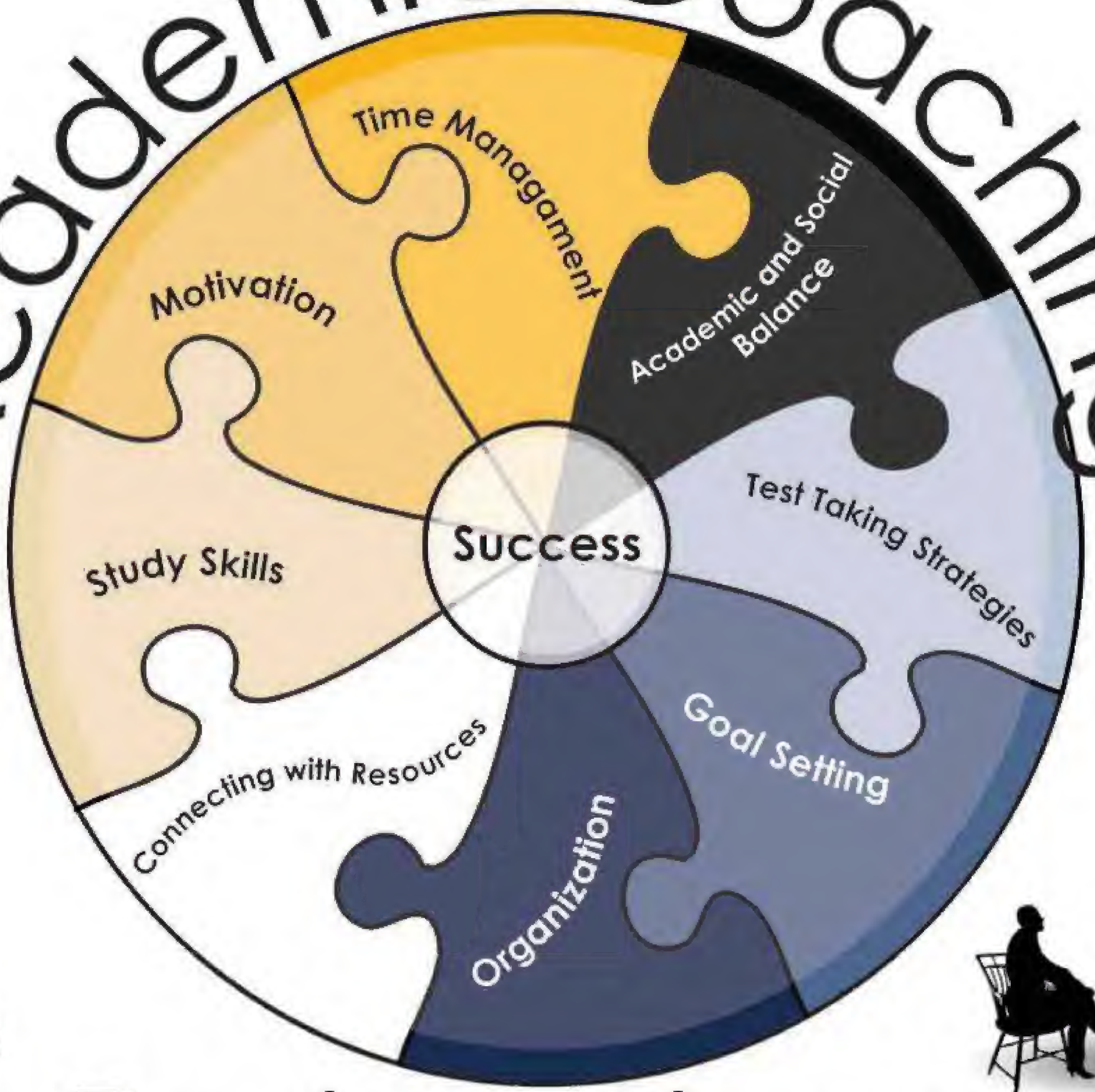
Academic Coaching



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Attach recent passport size photograph

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Enrolment Form

(for Classroom/Integrated Programs)

Student's Name (in Block Letters) .....

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Permanent Address .....

.....

.....

Contact No. *(Mobile)* .....

College Last Attended / Presently Attending .....

Last Qualification .....

Father's Name.....Father's Qualification :.....

Father's Mobile No :.....

FEE STRUCTURE

	MSc entrance exams	PhD/JRF entrance exams
Regular	25000	25000
Weekend	18000	15000
Corrospondence	10000	10000
Corrospondence	2000	1500

Kindly submit the form with the following

1. Cash/ Demand Draft(s) / Pay Order(s) for the fee. 2. Any one of the following documents : Photocopy of collegeID card with photograph / Photocopy of last Board or collegeMarksheet supported by any Identity Proof of student/ Photocopy of Transfer Certificate / Bonafide certificate issued by the Principal of collegewith student's photograph. Make a photocopy of this form after filling the required information and before submitting it to EUBIO ACADEMY.

NOTIFICATION

PANJAB UNIVERSITY

DEPARTMENT OF BOTANY
CHANDIGARH - 160 014
(Estted. Under the Panjab University Act VIII of 1947 – enacted by the Govt. of India)

Applications are invited for the Award of UGC BSR Research Fellowship in Sciences for Meritorious Students (Botany).

Under this scheme the UGC has approved 05 (Five) Research Fellows at a monthly Fellowship along with a contingent grant as per detail given below.

1. For Non UGC/CSIR/SLET/GATE/ (J0RF) Examination and P.U. Ph.D. Entrance Test Qualified candidates, the Fellowship will be Rs. 14,000/- p.m. (fixed) plus H.R.A. for 1st and 2nd year and Contingency @ Rs. 12,000/- p.a. as per UGC/University rules. In the 3rd,4th and 5th year fellowship @ Rs. 16,000/- p.m. (fixed) plus H.R.A. and Contingency @ Rs. 25,000/- p.a. as per UGC/ University rules.
2. For UGC/CSIR/SLET/GATE/ (JRF) Examination qualified candidates, the Fellowship for 1st & 2nd year will be Rs. 16,000/- p.m. (fixed) plus HRA and Contingency @ Rs. 12,000/- p.a. as per UGC/University rules. In the 3rd, 4th and 5th year the fellowship will be Rs. 18,000/- p.m. (fixed) plus H.R.A and Contingency Rs. 25,000/- p.a. as per UGC/ University rules.

Qualifications/ Eligibility:

The candidates should be M.Sc. in Botany with at least 55% marks. The candidates who are enrolled/registered or eligible for enrolment/registration for Ph.D. in the subject of Botany as per the P.U. guidelines and have passed entrance test of Panjab University or UGC/CSIR/SLET/GATE/ (JRF) Examination are eligible. Preference for selection will be given to those who are not getting fellowship but are otherwise eligible for the grant. Selected candidates who are eligible for enrolment will have to submit duly completed enrolment form within three days of the selection failing which the selection shall get cancelled without any prior notice. The selection will be subject to the approval by the UGC. The Department of Botany or the University will not be responsible for the award of fellowship in case UGC, for whatsoever reason/s, fails to approve or delays in approving or granting the fellowship. The department/ university is only the recommending body. The allotment of guide and field will be subject to availability of seats with the guide/in the lab.

How to Apply:

The application on plain paper giving detailed bio-data along with self attested copies of the testimonials should reach the Office of the undersigned **latest by 17.11.2014.** The interview date will be intimated later on. No T.A. & D. A. is permissible for attending the interview. The rules and regulations as laid down by Panjab University and /or University Grants Commission will govern the terms and conditions of fellowship of the selected candidates. The candidates can also apply through e-mail: chairman.botany@pu.ac.in

Tenure:

The tenure of fellowship is initially for two years under the RFSMS scheme. Upon expiry of this period, the work of the Fellow will be evaluated by Experts Committee of the university. If the research work is found satisfactory, his/her tenure will be extended for a further period of three years. The total period of fellowship is 5 years with no further provision of extension.
The selected candidates shall be entitled to the fellowship only after approval by the UGC and receipt of the grant.

NOTICE STUDENT

CSIR-INSTITUTE OF GENOMICS & INTEGRATIVE BIOLOGY

Mall Road, Delhi – 110007

POSITIONS OPEN FOR TEMPORARY RESEARCH PROJECT POSTS

(Date of interview – 21st Nov., 2014 at 10:30 AM)

CSIR-Institute of Genomics & Integrative Biology (IGIB), desires to engage qualified incumbents on purely temporary basis as detailed below:

Research Associate - 2
Project Fellow - 1
Sr. Project Fellow - 1
Medical Lab. Attendant - 1

The duration of the post is initially for One year or till the closing date of the project, whichever is earlier. Tenure may be extendable up to project duration. Contract may be terminated at any time by giving one-month notice by either side. The applicants will have no claim implicit or explicit for consideration against any CSIR/IGIB post.

Candidates should note that non-fulfillment of the eligibility criterion will result in cancellation of candidature at any stage.
No application would be entertained with "result awaited" status or after due date.
List of shortlisted candidates will be put up on CSIR-IGIB website.
No TA/DA will be paid to the candidates to attend the interview. The engagement shall be as per guidelines of CSIR/Funding agency. Candidates will have an option to give reply in Hindi.

Note: The shortlisted candidates, have to report at 09:00 AM at Mall Road Campus, Delhi - 110007 on the day of interview along with any Photo ID card, (without photo ID card interview will not be conducted). 3 copies of updated signed C. V. (clearly mentioning Date of Birth and Hightest Qualification with percentage), Dissertation (if any), PhD thesis (if any) and original certificates/Self attested photocopies for verification.

Entry will be closed by 10:00 AM.

NOTICE STUDENT

National Brain Research Centre

(Deemed University)
NH- 8, Nainwal Mode, Manesar -122051, Dist. Gurgaon, (Haryana)
Tel. Nos. 91-124-2845 339 / 2845 344, FAX: 91-124-2338 910 / 2338 928
E-mail: admissions2015@nbrc.ac.in Website: www.nbrc.ac.in

Admissions to Ph.D. and M.Sc. (Neuroscience) programmes for the year 2015

Candidates for the Ph.D Programme may take one of the following screening exams

1.Joint Graduate Entrance Examination for Biology and Interdisciplinary Life Science (JGEEBILS) conducted by NCBS/TIFR. For JGEEBILS advertisement, please check the website: https://www.ncbs.res.in/JGEEBILS

2. Graduate Aptitude Test in Engineering (GATE-2014/GATE-2015) for selected subjectswww.nbrc.ac.in only (please see the website). For GATE information, see http://gate.iitk.ac.in/GATE2015/

3. Joint Entrance Screening Test (JEST-2015). For details of JEST-2015, please visit www.jest.org.in

4. CSIR (JRF; Chemistry; 2014-15 batch). For CSIR (JRF) details, please visit
www.csirhrdg.res.in

For M.Sc. (Neuroscience) programme, candidates will be screened through JGEEBILS only. Candidates selected for M.Sc. (Neuroscience) programme will be eligible to switch to M.Sc.–Ph.D. Integrated programme of NBRC subject to fulfilling the required criteria.
Candidates for M.Sc. and Ph.D. will be short-listed for a two-tier interview based on their performance in the JGEEBILS/GATE examination*/JEST-2015*/CSIR (JRF; Chemistry; 2014-15)* examination.
GATE/JEST/CSIR channels are valid for Ph.D. programme only. Admission to MSc (Neuroscience) is restricted to JGEEBILS candidates.

For detailed information, please visit our website: www.nbrc.ac.in/admissions. You can also write to admissions2015@nbrc.ac.in

IMPORTANT DATES For JGEEBILS Applicants

NBRC Application (online/offline) opens at www.nbrc.ac.in/admissions.php :
22 October 2014
Last date of application (online / offline) to NBRC: 31 December 2014
Last date for receipt of Demand Draft at NBRC for online & offline applications:
09 January, 2015

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PROPOSALS

A joint Indian Council of Medical Research (ICMR); Department of Biotechnology(DBT) & Ministry of Health & Family Welfare (MOH & FW) initiative for promoting "Indigenous diagnostic technologies for diagnosis of TB and MDR/XDR–TB"

In a Joint venture of Department of Bio-technology (DBT), Indian Council of Medical Research (ICMR) and Ministry of Health & Family Welfare (MOH & FW), ICMR has taken a lead for promoting "Indigenous diagnostic technologies for diagnosis of TB and MDR/XDR–TB" developed by Indian scientists/companies.

There is a need for better kits for the detection of TB-MDR/XDR TB under the programme. There are various indigenous technologies developed by Indian scientists for detection of MDR/XDR TB and these technologies are in advanced stages of development and need support and partnerships from Government and industry to enable commercialization. It is important to identify the best technology/ies based on defined parameters and then pick them up for commercialization without losing time. The objective of this initiative is to learn the status of the Indian indigenous technologies developed by the Indian researchers and discuss the way forward so that these can be made available/commercialized for larger use.

It is the time to push best Indian technologies forward and Government is committed to provide financial support for the validation of these technologies in a collaborative manner. MOH&FW will extend full support to take these technologies forward if they are ready, cost effective and are found to be suitable for use in the programme as per the recommendations of the Committee. The funds for external validation would be provided by DBT/ICMR/DHR and the external validation would be carried out in a multicentric manner.

The scientists, companies and the researchers working in this area are encouraged to send the details of their diagnostic kit(s) in given format (Annexure) to ICMR/DBT at the following address, if interested. The researchers and companies can work on developing cheap, point of care test, molecular technologies for use in programme in PHC"s, CHC level, in district microscopy centers under RNTCP. The technology picking up maximum number of mutations and providing result in one day and are cost effective would be preferred.

Contact Address: 1. Dr. Rashmi Arora, Head, Division of ECD, ICMR, e-mail: arorar@icmr.org.in;

INDIA – ISRAEL INITIATIVE FOR INDUSTRIAL R&D (i4RD) PROGRAMME 2014

A Bilateral Framework providing financial support for collaborative industrial R&D Projects between Indian and Israeli companies and Department of Science & Technology (DST)

Government of India is implementing the industrial R&D programme with Israel through Global Innovation & Technology Alliance (GITA). A Call has been launched to invite the Joint Industrial R&D Projects jointly with MATIMOP – Israeli Industry Center for R&D, on behalf of the Office of the Chief Scientist (OCS), Ministry of Economy, Government of Israel.

Focus Areas of Proposals to be funded:

The current Request for Proposal (RFP) is open to projects in the following sectors, based on the merit, that include Science and Technology (S&T) development leading to commercial success, social good and benefit to both countries.

- Affordable Healthcare
- Energy Sector
- Agro Sector
- Water Sector
- Information & Communication Technology (ICT) and Telecom

This is an excellent opportunity for bilateral collaborative industrial R&D projects between Indian and Israeli companies with funding support from their respective governments.

Funding Mechanism:

Under this Programme in India, funding is available to the Indian Industry up to 50% of the total eligible Indian cost of the project; with a limit of INR 1.50 Crores per project; by way of Soft Loan (@3 %, per annum, Simple Interest). Partnering academic/research organisations (if any) would receive grants-in-aid up to 100% of their part of eligible Indian cost in the project.

Selection Criteria

The project should be innovative aiming to lead to a new product or process with clear commercial potential, have complementarity of effort of R&D activities both the countries and must be upto 24 months duration.

In India, the application will be strengthened by the participation of academic and institutional researchers and by including young researcher exchanges as a component of the R&D program.

For more information please visit: http://gita.org.in/funding_India-Israel.html

Last date for submission of application is December 19, 2014

Read Only

TWAS, India strike major accord

India's Department of Science and Technology will provide TWAS $1 million over five years as part of a joint effort focused on education and science diplomacy.

PhD training, postdoctoral research and science diplomacy will be the focus of new cooperative efforts under a new agreement between TWAS and India's top science agency.

TWAS Executive Director Romain Murenzi, left, and Secretary of the Indian Department of Science and Technology Krishnaswamy VijayRaghavan sign an agreement at TWAS's 25th General Meeting in Muscat, Oman on Sunday, 26 October. (Photo: Edward W. Lempinen)

MUSCAT, Sultanate of Oman – India and its Department of Science and Technology will provide TWAS with $1 million over the next five years as part of a major new agreement to support cooperative efforts in PhD education, postdoctoral training and science diplomacy.

Under the agreement, the Department (DST) and TWAS will embark on an ambitious new programme of science diplomacy training and events both in India and in Trieste, Italy, where TWAS is based. In addition, the agreement provides for DST and TWAS to work together on a Pan-Africa Doctoral Fellowship programme for about 100 fellowships over five years, with funding from DST.

DST would pay TWAS $1 million, or USD200,000 per year from 2015 through 2019.

The "programme of cooperation" agreement was signed Sunday in a brief ceremony during the 25th TWAS General Meeting in Muscat, Sultanate of Oman.

Government of India Department of Science & Technology 'KIRAN' Division

Nominations for the National Award for Women's Development through Application of Science & Technology – 2014-15

This award has been instituted to recognize the contributions of individuals/ institutions who have worked at the grassroot level for women's development through application of science and technology.

Nature of the Award

This prestigious award is announced every year. It comprises of a memento, a cash prize of Rs.1.00 lakh for individual Rs. 10.00 lakhs for institution and a citation.

Persons eligible to Nominate

Nomination for the Award can be made by Vice Chancellors of Universities, Directors of R&D institutions, Heads of science based voluntary organizations, Secretaries of S&T departments, Secretaries of State Departments/State Councils for S&T and earlier winners of this award.

"The last date for receipt of completed nominations is 30th November 2014"

The programme will be known as Partnerships for Inspiring and Empowering Next Generation Scientific Talent (PIE-NGST).

"We regard this as a very important initiative, an investment in the future, and we look forward to a very productive partnership," said Sadhana Relia, head of DST International Multilateral and Regional Cooperation Division (IMRCD). "India continues its journey of increasing its share in the pie of TWAS scientific affairs devoted to the cause of developing world."

"India and TWAS have had a long, historic partnership that has produced great benefits for science and the developing world," said TWAS Executive Director Romain Murenzi. "We are honoured to be part of this agreement with our Indian colleagues, and I am confident that this new agreement will yield very valuable dividends."

The agreement was signed by Murenzi and DST Secretary Krishnaswamy VijayRaghavan.

The Department of Science and Technology is within the India's Ministry of Science and Technology in India. Among other initiatives, it funds scientific research and international science engagement by Indian researchers.

According to the document, the new partnership will help both sides pursue their common values: "building scientific capacity and excellence for strengthening collective self-reliance in science, resolving critical issues in pursuit of scientific research and catalyzing socio-economic development among developing countries."

The partnership between TWAS and India dates back to TWAS's founding in 1983. Of 42 founding fellows, 12 were Indian – making India the single biggest national contingent among the Founding Fellows who worked with Pakistani Nobel laureate Abdus Salam to establish the Academy.

Over the years, the partners have shared a common vision of building healthier and more prosperous societies in the South through science and technology. India has made significant contributions to the TWAS endowment fund. Today, TWAS works in partnership with Indian research centers to offer a range of PhD and postdoctoral research fellowships to early-career scientists from the developing world.

The new DST-TWAS "programme of cooperation" establishes initiatives in science diplomacy and research training, areas of special interest for both partners.

Science diplomacy: Under partnerships with the American Association for the Advancement of Science and the Swedish International Development Cooperation Agency (SIDA), TWAS is emerging as a hub for science diplomacy training for the developing world.

Now India will send up to 10 participants to science diplomacy courses organized by TWAS in its home city of Trieste, Italy. TWAS and DST will also cooperate on regional programmes on science diplomacy in India for about 30 participants from developing countries.

Science training for Africa: The agreement provides for TWAS and DST to join in a "Pan-Africa Doctoral Fellowship" for about 100 fellowships over five years for early-career African scientists, with funding from DST.

Science capacity-building for India: TWAS and DST would support a range of activities focused on India and South Asia: regional scientific meetings; a high-level lecture series to engage the public in emerging science issues; and expanding the network of TWAS-affiliated centres of scientific excellence, especially in South and Central Asia.

In addition, TWAS would facilitate the placement of about 200 fellows from DST's talent-building INSPIRE programme – 100 postgraduates, 75 doctoral and 25 postdocs – at world-class research institutions across developing countries to enhance their international experience.

BIOTECH JOBS

Indian Oil is India's flagship national oil company with business interests straddling the entire hydrocarbon value chain – from refining, pipeline transportation and marketing of petroleum products to exploration & production of crude oil & gas, marketing of natural gas and petrochemicals. It is the leading Indian corporate in the Fortune 'Global 500' listing, ranked at the 96th position in the year 2014.

Applications are invited from Indian Nationals desirous of a career in Research & Development for the positions listed below. The Corporation offers excellent opportunities for individual growth and contribution based on performance and potential.

Applications are invited from Indian Nationals desirous of a career in Research & Development for the positions listed below. The Corporation offers excellent opportunities for individual growth and contribution based on performance and potential.

Research Officer (Biotechnology) (Gr A)
Intellectual Property Sr. Officer (Gr B)

LAST DATE OF RECEIPT OF APPLICATIONS: 05.12.2014

ELYNS Publishing Group –

Hyderabad, Andhra Pradesh
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Opportunity for the freshers to work as Assistant Managing Editors

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MCQs Microbiology

Q.1 Major stimulus for spore formation in bacteria is
(A) Nutrition limitation (B) Heat stress
(C) Cold (D) pH stress (CSIR 2012-JUN)

Q.2 Which enzyme is the target of drugs used to treat disease caused by influenza virus?
(A) Collagenase (B) Hyaluronidase
(C) Neuraminidase (D) Proteinase IISC 2008

Q.3 A species of bacteria found at the bottom of a shallow pond has a hard cell wall and a semi-permeable membrane. Which of the following statements is true?
(A)The cell wall prevents the cell from being crushed by external forces
(B) The cell wall prevents the cell from exploding due to internal pressure
(C) The internal and external pressure are equal, hence the cell wall determines shape
(D) None of the above NCBS 2011

Q.4 Injection of an extract from the lotus leaves in a rabbit induces immune response. The characterization reveals that some of the antibodies can selectively recognize a protozoan antigen. Also the infection assays reveal that the rabbit becomes immune to the protozoan infection. Based on these observations, it is claimed that lotus leaves have an alkaloid that induces production of anti parasitic antibodies. Which of the following observations will weaken this claim substantially?
(A)The pond water- from where the lotus leaves were taken- shows very high parasitic count.
(B) Lotus leaves do not have alkaloids that have been previously reported to have anti parasitic activity
(C) When the lotus leaves samples from 50 different ponds were screened, only 10 % showed increased antibody production when injected in rabbits
(D) When the un-injected rabbits -grown in the laboratories were screened, 0.5% showed antibodies against the parasites. NCBS 2011

Q.5 Neisseria meningitides is a
(A) Gram +ve bacillus (B) Gram +ve coccus
(C) Gram –ve bacillus (D) Gram –ve coccus (IIT JAM 2011)

Q.6 A peritrichous arrangement of flagella in bacilli is a
(A) single flagellum at one pole
(B) single flagellum at each pole
(C) cluster of flagella at one pole
(D) uniform distribution of flagella around the cell (IIT JAM 2011)

Q.7 Mad cow disease is caused by a
(A) bacterium (B) virus
(C) viroid (D) prion (IIT JAM 2011)

Q.8 A phage infects bacteria at a multiplicity of infection (moi) of 0.1. This means that
(A) every bacterium is infected by the phage
(B) one out of 10 bacteria is infected by the phage
(C) ten phage infect one bacterium
(D) only 1/10 of the phage population is infectious (IIT JAM 2011)

Q.9 Which of the following is NOT a common feature of retroviruses?
(A) They are enveloped (B) Their RN A is spliced
(C) They contain LTRs (D) They integrate into host DNA
IISC 2010

Q.10 The function of a heterocyst in aerobic Cyanobacterium spp. is to facilitate
(A) rapid cell division (B) DNA replication
(C) nitrogen fixation (D) infection of host plants
IIT JAM 2009

Q.11 A bacterial culture contained 32x106 cells after 2.5 hours of exponential growth. If the
doubling time was 30 min, what was the initial population number in this culture?
(A) $20x10^4$ cells (B) $10x10^5$ cells
(C) $40x10^5$ cells (D) $16x10^6$ cells IIT JAM 2006

Q.12 The quantity of bacteriophages in a given sample is best given as
(A) Colony forming units (CFU)
(B) Minimum inhibitory concentration (MIC)
(C) Plaque forming units (PFU)
(D) Lethal dose 50% (LD50) IIT JAM 2006

Q.13 The approximate total number of red blood cells (RBC) in a human body is 25x1012 . About 2x10l1 RBCs are produced per day. Therefore, the RBC on an average survives for
(A) 12.5 days (B) 2.5 days
(C) 125 days (D) 200 days IISC 2008

Q.14 Which of the following statements is true with respect to the influenza virus
(A) Hemagglutinin present in the virus envelope is involved in attachment of the virus to sialic acid residues of the host cell surface
(B) Hemagglutinin present in the virus envelope is involved in attachment of the virus to N- acetylglucosamine residues of the host cell surface
(C) Hemagglutinin protein form tetramers that project out from viral surface.
(D) Hemagglutinin is not a glycoprotein.
(IIT-JAM 2005)

Q.15 A culture of Mycobacterium leprae was subjected to alkaline ethanol extraction prior to acid fast staining. The color of the culture following staining will be
(A) Red (B) Green
(C) Yellow (D) Blue

Q.16 The genome of the Avian flu virus (H5N1) that causes bird flu consists of
(A) Single stranded DNA (B) Positive strand RNA
(C) Negative strand RNA (D) Double stranded DNA

Q.17 Match the products in group 1 with their producer organisms given in group 2

Group I	Group 2
(P) Ethanol	1. Strepromyces orien tails
(Q) L-Lysine	2. Saccharornvces cerevisiae
(R) Biopesticide	3. Corynebacteriurn giutarnicum
(S) Vancomycin	4. Bacillus thuringiensis

(A) P-2; Q-3; R-4; S-1 (B) P-3; Q-4; R-1; S-2
(C) P-4; Q- 1; R-2; S-3 (D) P-2; Q-1; R-4; S-3
GATE 2008

Q.18 Viroids differ from viruses in
(A)Satellite RNA packaged with viral genome
(B) Naked DNA molecules
(C) Naked RNA molecules only
(D) Naked DNA packaged with viral genome

Q.19 Genetic material of retroviruses is
(A)Single stranded RNA (B) Single stranded DNA
(C) Double stranded RNA (D) Double stranded DNA.

Q.20 Chemosynthetic organism is found in
a) Deep sea thermal vent b) salt lake
c) domestic sewage d) polar ice (NCBS -2009,10)

Q.21 The bacterium used in Ames toxicity test:
(A) Escherichia coli (B) Micrococcus aureus
(C) Salmonella typhimurium (D) Bacillus subtilis

Q.22 Diauxic pattern of biornass growth is associated with
(P) multiple lag phases
(Q) sequential utilization of multiple substrates
(R) simultaneous utilization of multiple substrates
(S) absence of lag phase
(A) P, R (B) P, Q
(C) R, S (D) Q, S GATE 2008

Q.23 The taxonomic resolution between Archaea and Eubacteria was highlighted using the following by Carl Woese
(A) Serological techniques
(B) Protein electrophoresis patterns
(C) Gram staining
(D) rRNA studies IIT JAM 2006

Q.24 Which one of the following statements is true with regard to the nature of viroids and prions?
(A) Viroids are DNA and prions are RNA
(B) Viroids are protein and prions are RNA
(C) Viroids are RNA and prions are protein
(D) Both are made of protein IIT JAM 2006

Q.25 Match the items in group 1 with the terms given in groups

Group I	Group 2
(P) Lactobacillus and Bifidobacteria	1. Prebiotics
(Q) Polychlorobenzenes (PCBs)	2. Probiotics
(R) Fructose oligosaccharides	3. Antibiotics
(S) β-Lactams	4. Xenobiotics

(A) P-2, Q-4, R-1, S-3 (B) P-3, Q-4, R-1, S-2
(C) P4, Q-1, R-2, S-3 (D) P-I, Q-3, R-4, S-2
GATE 2008

Q.26 A culture of the Bacillus brevis when transferred to moisture free conditions
(A) utilizes glucose as the only carbon source
(B) undergoes division thus increasing it's number
(C) undergoes sporulation
(D) all of the above are observed

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